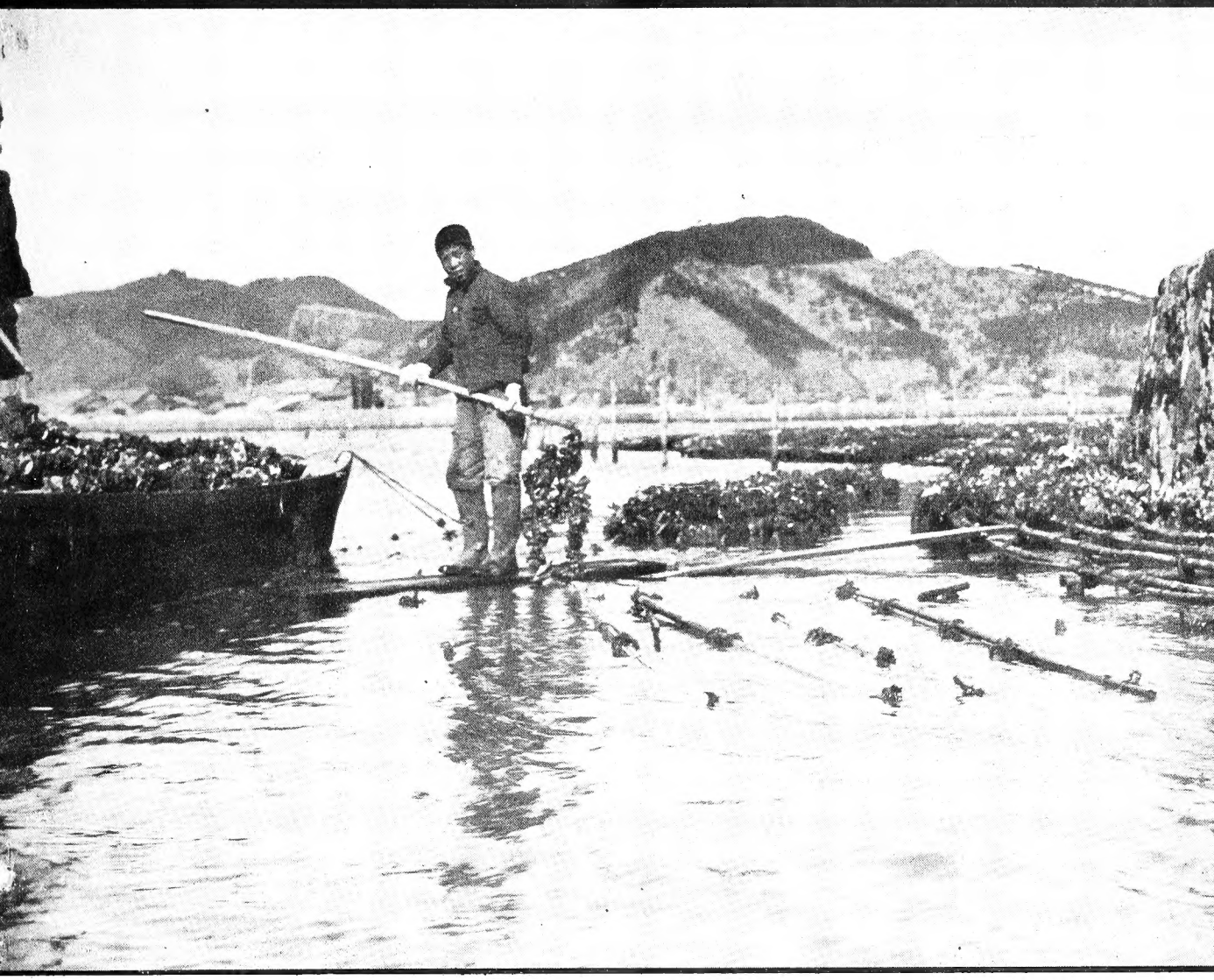
COMMERCIAL FISHERIES REVIEW



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COMMERCIAL FISHERIES REVIEW

A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE BRANCH OF COMMERCIAL FISHERIES

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CONTENTS

COVER: REMOVING SEED OYSTERS FROM "HARDENING" RACKS IN THE SPRING IN A JAPANESE PROTECTED BAY AMONG THE MATSUSHIMA ISLANDS OF MIYAGI PREFECTURE. THESE STRINGS OF SHELLS WERE REMOVED FROM RAFTS OR ROCKS AND PLACED UPON THESE "HARDENING" RACKS THE PREVIOUS AUTUMN (SEE ARTICLE ON PAGE 1).

COMMERCIAL FISHERIES REVIEW

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JAPANESE METHODS OF OYSTER CULTURE

By John B Glud*

INTRODUCTION

Oyster culture in Japan dates back to the early history of the country. Food from the sea was extremely important because of huge populations concentrated along the narrow coastal plain. Here oyster culture has been tried in many ways and examples of the most primitive to very advanced methods are to be seen. The abundance of labor makes possible methods which would be unprofitable elsewhere, and yet in these methods may exist an idea which, if properly applied, would solve problems in other parts of the world.

Oysters are grown practically along the entire coast line of Japan, but the industry centers in the following favorable areas:

1. The great shallow bays among the Matsushima Islands near Sendai in northern Honshu are wonderfully adapted to oyster culture. These waters are rich in the foods needed by larval oysters making this area a center of seed production.

2. Thousands of acres of bottoms in Tokyo Bay produce oysters but never in sufficient quantity to meet the great demand.

3. The Inland Sea, including the waters in front of Hiroshima, is the oldest center of oyster culture in Japan. Warm protected waters and great expanses of tidelands combine to make this area a large producer of oysters.

4. Matoya Bay and the many other inlets near Nagoya are admirably suited to the culture of food oysters as well as pearl oysters.

5. Yatsushiro Bay in Kumamato Prefecture on the island of Kyushu also produces many oysters.

Two general methods of oyster culture are used in Japan; those in which the oysters are placed upon the bottom, and those in which the oysters are suspended above the bottom. Each method has certain advantages and disadvantages as described below.

BOTTOM CULTURE

MATSUSHIMA ISLANDS: Among the Matsushima Islands in Miyagi Prefecture in northern Honshu, the tidal range averages about four feet and the depth at low tide is less than ten feet. Oysters are grown at the bottom from natural seed or from planted seed in the same manner as along our Atlantic Coast. Harvesting is done exclusively with small hand tongs. Few oysters are produced by this method principally because of the predations of oyster drills and starfish.

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Note: This report is based upon observations made while the author was in Japan in 1947 and 1948, representing the State of Washington Department of Fisheries and the Pacific Coast Oyster Growers Association in the inspection of seed oysters which were being exported to the United States.

TOKYO BAY AND INLAND SEA: In these areas the tidal range is greater than in Miyagi Prefecture, exposing large areas of tidelands at low tide. Seed oysters attached to scallop, oyster, abalone, or clam shells are placed upon the beach. Predators are hand picked from the beds and the oysters are moved from growing grounds to fattening grounds before marketing. Harvesting is done at low tide by hand. In many ways these methods correspond to those used along our Pacific Coast.

YATSUSHIRO BAY: The bottom of this bay in southern Kyushu is largely soft mud. During the summer, it is exposed to severe typhoons which make oyster culture very difficult. This area also has a greater tidal range than in northern Honshu.

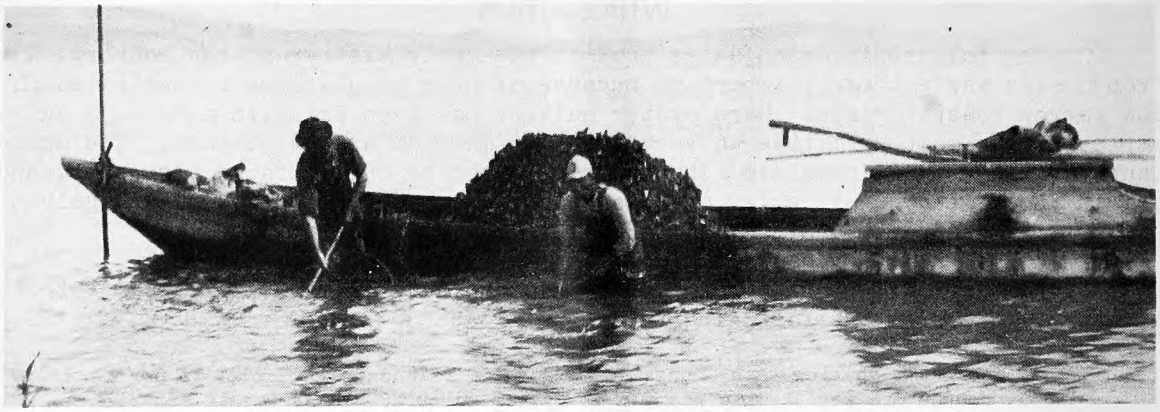

FIGURE 1 - HARVESTING OYSTERS IN YATSUSHIRO BAY, KUMAMATO PREFECTURE.

Seed oysters are obtained here by placing round stones 2½ to 4 inches in diameter on the bottom at the mouth of a small river where spatting is good during May. The stone cultch with the attached oysters is left in this protected location until the typhoon season is over and then taken by small boat to the growing grounds.

The stones are placed upon the bottom in parallel bands about five feet wide with a space of about six or seven feet between the rows. Years of placing the stones in the same bands has built up the level of the bottom and has left channels between the rows.

In September or October of the second year when the oysters have grown to marketable size, the Japanese oystermen bring small open boats through the channels and fill them with oysters, for transfer to fattening grounds. The growing grounds are at a medium tidal level, but fattening grounds are at a low level where oysters are exposed only at extreme low tide.

After 2 or 3 months, the oysters are harvested by raking them onto small wire-covered frames which are then agitated to wash the mud from the shells. The oystermen wear rubber waders and work in water as deep as three feet. (Figure 1.) This primitive method is very slow and laborious as the rocks are included with the oysters and must be handled many times. The stones are saved and are again placed in the water as cultch during the following summer.

However, stone cultch has two advantages: it stays in place during typhoons, and it holds the oysters up above the mud.

RACK CULTURE

Oyster drills and starfish cause great mortalities among oysters grown upon the bottom. Others are smothered by silt.

To reduce these losses, the oysters are suspended from racks, or fences are built in the lower half of the intertidal zone. Most of these fences consist only of posts about eight feet apart with one horizontal pole placed on top.

The seed oysters are attached to old oyster shells which have a hole through the middle. These shells are strung on wire or tarred straw rope and held 6 to 8 inches apart by bamboo spacers or by twisting the strands of rope. The strings of seed are attached to the horizontal poles on the racks and must be short enough to clear the bottom by several inches. The oyster drills and starfish which crawl upon the bottom and cannot swim are thus kept away from the young oysters.

The principal difficulty with this type of culture is that these oysters become extremely heavy as they approach market size. This bends the poles and forces the posts deeper into the mud bottom. Soon the lowest oysters are touching bottom and predators are able to attack the oysters.

The advantage of rack culture is the rapid growth rate of the oysters placed above the bottom. The drills are mainly an enemy of the younger oysters so that rapid growth reduces the time during which they are attacked.

RAFT METHOD

In the protected bays among the Matsushima Islands of Miyagi Prefecture and in Matoya Bay near Nagoya and in other suitable locations, oysters are grown without ever touching bottom.

Seed oysters are obtained by punching holes in old oyster, scallop, or abalone shells and stringing them upon wires about 6 feet long. Scallop shells are usually preferred because of their large size. These strings of shells are draped over fences similar to those used in rack culture of oysters or suspended from rafts during the spawning season (Figure 2). Larval oysters attach to these shells in great numbers.

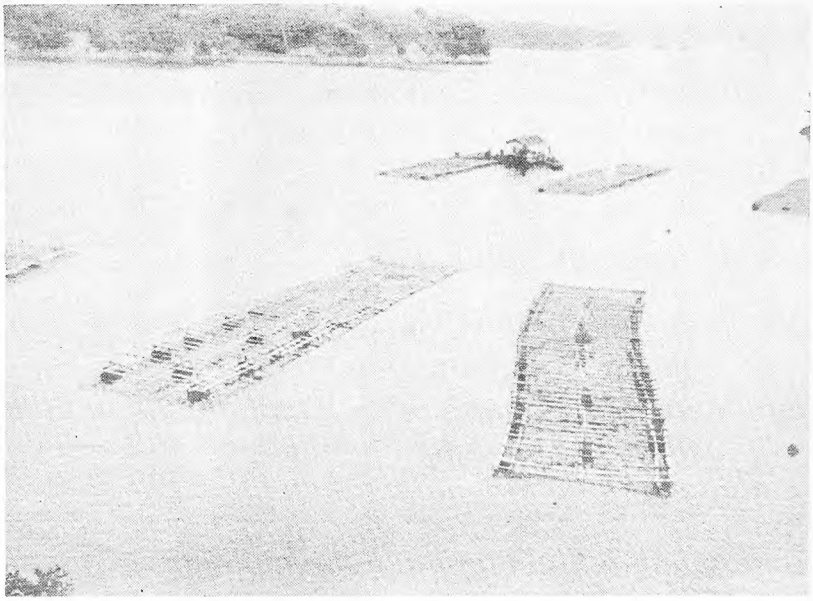

FIGURE 2 - OYSTER CULTURE RAFTS ARE ANCHORED IN DEEP PROTECTED BAYS.

In the autumn, the strings of shells are removed from the rafts or racks and placed horizontally upon wide "hardening" racks built about 18

inches above the beach in the intertidal zone (Figure 3). The seed oysters remain upon these racks until the following spring when they are taken ashore and shipped to the growing areas (see front cover page). Seed from Miyagi Prefecture is sent all over Japan by methods similar to those used in exporting seed to the United States.

At the destination, the shells with spat attached are strung on wires about 10 feet long with a 6- to 8-inch bamboo spacer between each shell.

Rafts are supported by tarred wooden barrels or old oil drums held in place by an open pole framework. The strings of seed are attached to the rafts at about two foot intervals and the rafts are anchored in deep enough water so that the oysters will never touch bottom. (Figure 5)

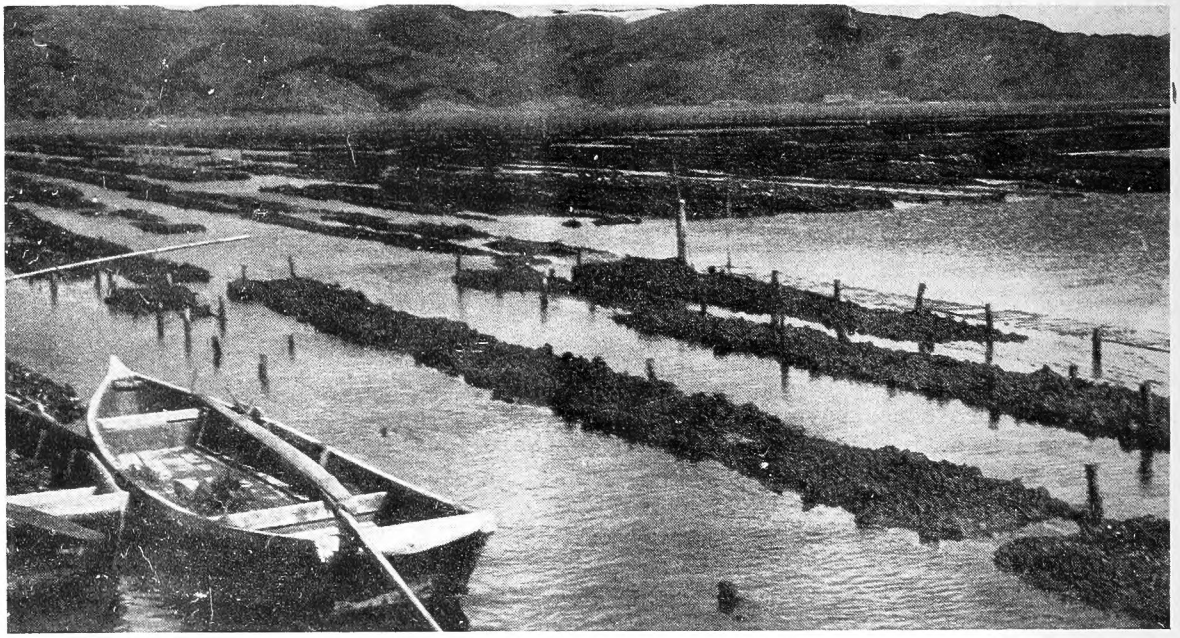

FIGURE 3 - SEED OYSTERS ARE HELD ON HARDENING RACKS AT WATANOHA THROUGH THE WINTER.

One year later in southern Japan or 1½ to 2 years later in northern Japan, the oysters are ready to be harvested. A simple "A" frame is placed on a boat or directly upon the rafts and used to lift the oysters out of the water. (Figure 6). The wire is cut near the bottom and the oysters slide into the boat. Wires and bamboo spacers are used only once.

A shortage of wire has caused many growers to substitute two strands of tarred straw rope twisted together (Figure 4). The shells bearing the spat are inserted between the strands at intervals of 6 to 12 inches and as the oysters grow they are held firmly in place.

GROWTH RATE AND REDUCTION

The Japanese claim that oysters grow much more rapidly suspended from rafts than they do on the bottom even when they are covered by water at all times.

Ordinarily oysters raised on the bottom in Miyagi Prefecture reached marketable size in 3 years. Raft-cultured oysters, however, are harvested after 1½ to

2 years. Seed oysters are caught in July and August and are hung from rafts the next April. By the following December to May, the oysters are ready to market.

In southern Japan similar Miyagi seed, hung from rafts in April, is harvested the following November. Local seed caught in Matoya Bay in July and suspended from rafts immediately is harvested the following May.

Oysters are marketed when about 3 inches long and are usually shucked and sold fresh. Lack of transportation facilities limit the fresh oyster market to the vicinity of the beds and some oysters are salted, dried, or smoked.

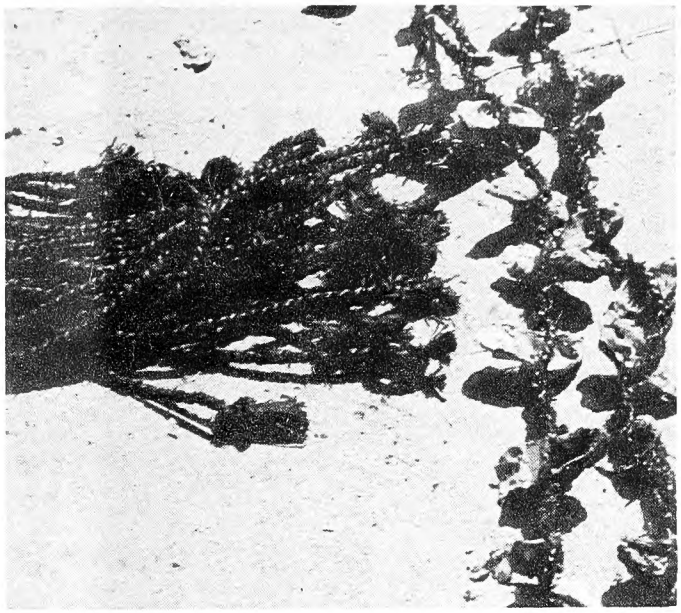

FIGURE 4 - OYSTER SHELLS BEARING THE SPAT ARE INSERTED BETWEEN STRANDS OF TARRED STRAW ROPE.

Production per-unit-area of the raft method of oyster culture is extremely high. Each 10-foot string produces about $\frac{3}{4}$ bushel of marketable oysters. Strings are spaced on 2-foot centers and rafts are tied end to end. Production on this basis can exceed 8,000 bushels per acre per year. This immense production is accomplished by utilizing the third dimension of depth.

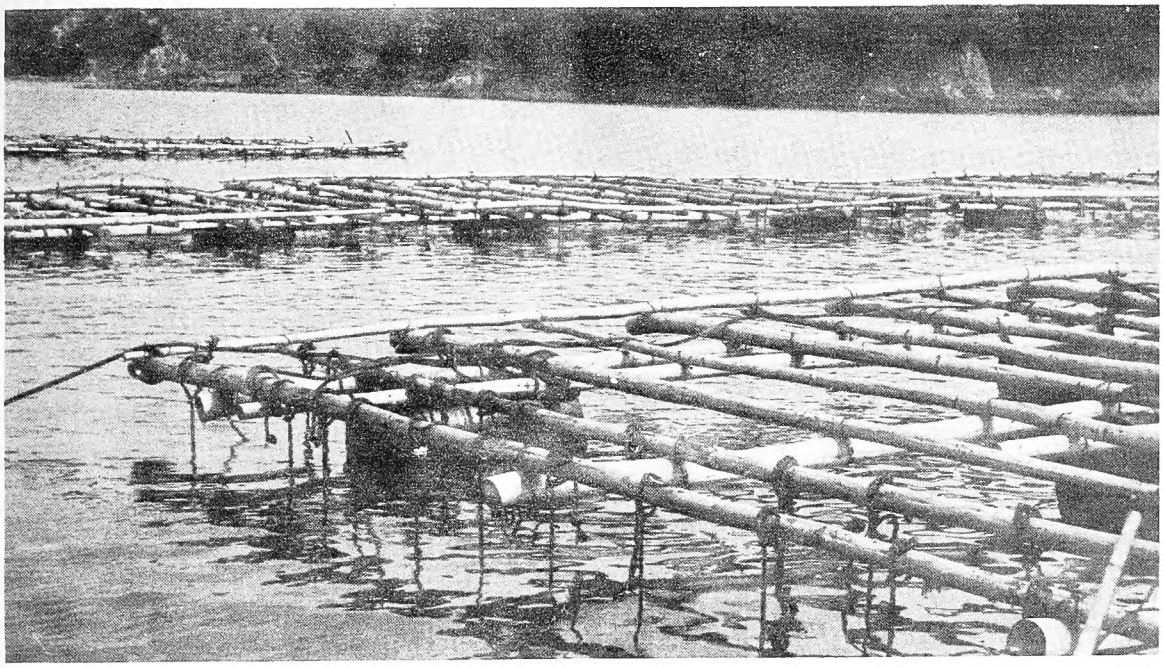

FIGURE 5 - STRINGS OF SEED OYSTERS ARE SUSPENDED BELOW RAFTS AND NEVER TOUCH BOTTOM.

ADVANTAGES AND DISADVANTAGES: In Japan where space is at a premium and labor costs are low, the raft method is very successful. Predations from crawling snails and starfish are eliminated, mortality by smothering of spat on the under side of cultch is eliminated, and all spat have an even chance to grow. More oysters can be raised per shell without excessive crowding because they can grow downward as well as outward and upward.

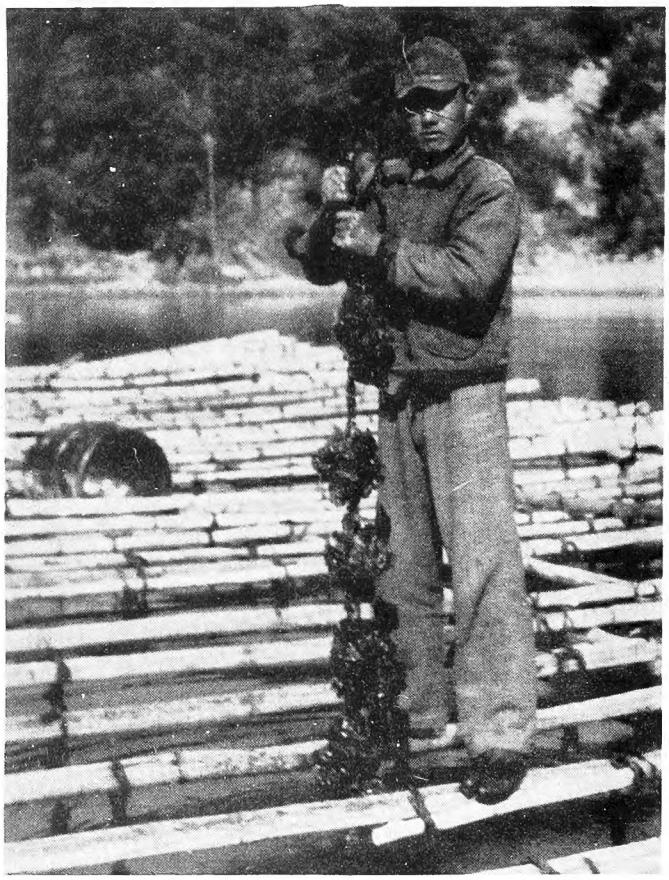

FIGURE 6 - AT THE END OF 1 OR 1½ YEARS, THE RAFT-CULTURED OYSTERS ARE READY FOR MARKET.

Oysters are held in warmer, less saline, and more nutritive layers of water close to the surface and growth is very rapid. Harvesting is simplified and can be done at any tidal stage.

Barrel floats for the rafts which are removed and tarred each spring will usually last 3 or 4 years. The pole framework is not underwater and lasts for many years. Poles are easily obtained on the hills adjacent to the oyster growing areas with low-priced labor.

The principal disadvantage to this method of oyster culture in Japan is that severe storms will break apart the rafts. A recent tidal wave smashed over 50 rafts in one bay and, therefore, raft culture is confined to the deep protected inlets along the coast.

APPLICATION IN UNITED STATES: In the United States raft culture of oysters is being experimented with near Vaughn, Washington. Vaughn Bay is a narrow branch of Puget Sound which is protected from storms. The rafts are constructed of a fir-pole framework and supported by oil drums. Strings of oysters are suspended from horizontal monel metal wires which are stretched across the rafts. Seed shells are strung on #12 galvanized wires about 8 feet long.

Instead of using bamboo spacers between the seed shells, one complete loop of the wire is made at 6-inch intervals, which separates the shells (Figure 7).

The seed oysters used in this experiment were imported from Kumamato Prefecture on the Island of Kyushu, and produce smaller oysters than seed from northern Japan. These tasty oysters, which have been named the "Washington Oyster", are expected to fill the demand for a small white oyster for the cocktail or half-shell trade. They become fat and marketable at a diameter of 1¼ to 1½ inches and because of their deeply capped shells, produce more meat than northern Japanese oysters of similar diameter.

Since the "Washington Oysters" are a specialty product, it is expected that raft culture will be profitable in spite of the extensive hand labor involved.

Further commercial application of the raft method of oyster culture on the West Coast will probably be confined to specialty products for the present.

At some future date when all of the tidelands and shallow bottoms are utilized to the maximum, it will still be possible to increase production by anchoring oyster rafts offshore. Many small protected bays in Puget Sound have steep beaches and therefore only a small acreage of oyster lands. These productive inlets are admirably suited to the raft method of oyster culture.

It is also possible that the ingenuity of the American oyster industry will develop better and more economical methods so that floating oyster culture can compete with conventional procedures.

FIGURE 7 - EXPERIMENTS WITH RAFT CULTURE AT VAUGHN, WASH.

USE OF PYREX TEST & CULTURE TUBES AS SOLUTION CELLS WITH PFALTZ & BAUER PHOTOELECTRIC FLUOROPHOTOMETER

By Charles S. Myers*

ABSTRACT

Matched test tubes or culture tubes were used to advantage with the Pfaltz and Bauer photoelectric fluorophotometer in place of the plane sided cuvettes. No instrumental difficulties were introduced by use of these tubes. A reasonable degree of precision and reproducibility of results can be readily attained. In the case of the thiochrome method, a straight line relationship between thiamine concentration and the reading was maintained throughout the range of concentration normally encountered. There was no difficulty in obtaining a supply of suitably matched tubes which yielded consistent results over a considerable range of instrument sensitivity.

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INTRODUCTION

During a study of the application of the well-known thiochrome method (1, 2, 3, and 4) to a variety of fishery products, it became desirable to investigate the feasibility of using ordinary test tubes as solution cells in the cuvette chamber of the Pfaltz and Bauer photoelectric fluorophotometer. There are many practical advantages afforded by such a practice, especially when a considerable number of more or less routine assays are involved. The results of adapting the above-mentioned instrument to the use of test or culture tubes as cuvettes for fluorometric work are reported below.

CONSTRUCTION OF AN ADAPTER

Inasmuch as the regular construction of the instrument did not permit the use of tubes in the measurement of intensities of fluorescent radiation (5 and 6), an adapter was constructed which enabled such usage without alteration of the original form of the instrument.

The latter was fashioned from scrap material available in the laboratory, namely, a wooden spool and small pieces of sheet Bakelite and spring brass. Although a machinist could readily manufacture a more presentable and durable model, that described on page 9 served the purpose and continues to be serviceable.

In Figure 1 are shown drawings of three views of the tube adapter. Only the dimensions of the cover plate are critical, because the latter replaces the regular plate covering the cuvette chamber. The adapter accomodates the oval-shaped bacteriological culture tubes as well as ordinary chemical test tubes. The tubes are held in place by two spring brass clips bent to the desired shape from strips of brass about 50 mm. long, and set into two slots sawed in each side of the spool or "turret". Extension of the depth of the spring clips from 21 to about 30 mm. would, perhaps, insure greater permanency with respect to the precision of alignment of the tubes. However, the depth indicated has thus far proved adequate. In this work, the exclusion of exterior light was completed by covering the "turret", with tube in place, with a mailing cylinder of appropriate dimensions.

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Certain features of the adapter, not ususally found in such an accessory, are as follows:

1. The strong positive action of the brass spring clips not only insures precise and reproducible alignment of either round, or oval-shaped tubes, but also accomodates variations in outside diameter between 15 and 22 mm.

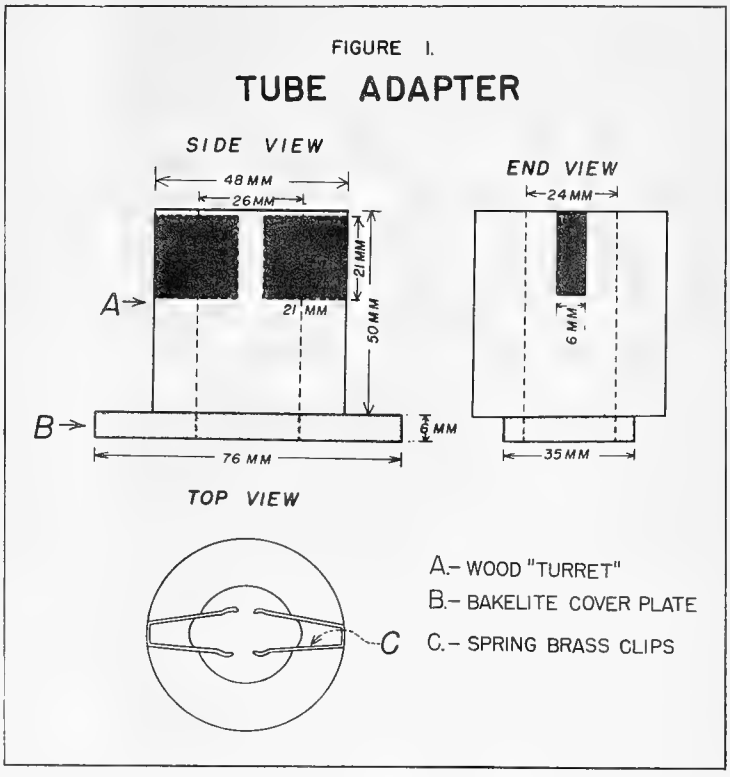
2. No part of the device extends into the cuvette housing to possibly effect interferences.

3. Successive measurements or a measurement of intensity of fluorescent radiation and transmitted light on the same solution are possible without disturbing the assembly; and, if desired, an identical surface may be readily presented to either photocell by simply rotating the tube.

THE MATCHING OF TUBES

Ordinary Pyrex chemical test tubes (18mm. in diameter) and oval culture tubes were tested in this work. Quinine sulphate dissolved in 0.1 N H_2SO_4 (0.2 microgram per ml.) was used as the standard reference solution. To minimize effects due to any instability of the quinine sulphate solutions to the exciting radiation (7), a fresh aliquot of the stock solution was used in each tube. To avoid "quenching effects" with temperature change (8 and 9), the reference solution was used at a reasonably constant room temperature (no significant "quenching effect" could be noted when the temperature of the solution was 22° ± 1° C.). Further, in selecting a group of matched tubes, the same procedure was routinely followed for taking readings. Thus, a uniform, minimum exposure to exciting radiation was maintained, such as was found to afford adequate protection of thiochrome solutions (6, 8).

FIGURE 1.



TEST TUBE OR CULTURE TUBE ADAPTER FOR PFALTZ AND BAUER FLUOROPHOTOMETER.

For the initial readings, the Pyrex brand trademark provided a convenient reference mark for the consistent positioning of the tubes. A distinguishing mark was permanently etched just beneath the trademark on an acceptable tube to serve both as a subsequent reference point, and as a means of identifying matched tubes. With special attention given to cleaning and general handling to avoid scratching, matched tubes

usually yielded reproducible results for an indefinite period. However, it was considered advisable to recheck the performance of tubes periodically or in the case of erratic results.

As an arbitrary standard for the selection of tubes, a variation of ± 0.5 scale division from the mean reading for a given lot of tubes was allowed when the absolute reading was about 50 percent of the total galvanometer scale. This limit of variation was proportionately reduced to ± 0.25 scale division for mean readings of 25 percent or less of the total scale. Tubes found acceptable at the former scale range were retested at the lower range with fresh standard solution, the lower range being obtained by reducing the intensity of incident light. Tubes acceptable at the higher range were usually also acceptable at the lower range of scale, as shown by the data following. Thus, a consistent response was usually obtained, over the range of scale commonly used in the regular assays, which includes a considerable range of instrument sensitivity, as well.

The data recorded in Table 1 are characteristic of those obtained for several lots of the different sizes and types of tubes. Group No. 3 consisted of tubes

Table 1 - Data on the Matching of Test, and Culture Tubes for Fluorometric Readings

Number of Test	Tubes Tested				Tubes Accepted	
	Number	Type	Mean Reading (galvanometer divisions)	Standard Deviation (galvanometer divisions)	Number	Percent of Total
1	24	18 mm., test	40.1	0.33	17	71.0
2	15	18 mm., test	44.6	0.46	11	76.0
3	25	18 mm., test	16.3	0.27	20	80.0
4	23	15 mm., test	35.8	0.43	14	60.5
5	13	15 mm., test	27.9	0.25	12	92.0
6	24	culture tubes	46.1	0.37	18	75.0
7	18	culture tubes	21.2	0.21	18	100.0
8 *	6	square cuvettes	60.4	1.09	-	-
9 *			60.4	0.80	-	-

*The cuvettes were turned end for end.

provided as "matched" by The American Instrument Company. Groups No. 5 and 7 consisted of the acceptable tubes from groups No. 4 and 6, respectively, and show the results of the retest at lower intensities, mentioned above. For comparison, the data for six regular square cuvettes are recorded as No. 8 and 9, each group consisting of the same six cuvettes, but with the latter turned end for end in the cuvette chamber in one case as compared with the other.

With the same intensity of incident light, the absolute readings obtained for the standard reference solution were about 38, 44, and 57 percent of that obtained with the special square cuvettes in the case of 15 mm.-test tubes, 18-mm. test tubes, and culture tubes, respectively. These values are approximately proportional to the ratio of the diameter of the respective type of tube to the width of the side of the square cuvette facing the photocell.

THE USE OF MATCHED TUBES IN THE THIOCHROME PROCEDURE

For the oxidation to thiochrome and preparation of appropriate blanks, according to the well-known thiochrome procedure (1, 2, 3, 4, and 10), 5 ml. aliquots of standard solutions of thiamine hydrochloride were used. The concentrations of the latter ranged from 0.05 to 0.4 microgram per ml.. Readings of the usual iso-

butyl-alcohol extracts of samples and blanks, using the previously mentioned types and sizes of tubes as solution cells, are recorded in Table 2. Data for the same series of standard solutions using the regular cuvettes are recorded for comparison.

Table 2 - Data on the Assay of Pure Thiamine Solutions, Using Test, and Culture Tubes as Solution Cells

Solution Cell	Thiamine in Sample in Micrograms	Total Reading (galvanometer divisions)	Blank Reading (galvanometer divisions)	Net Reading (galvanometer divisions)	Galvanometer Divisions Per Microgram (calculated)	Mean Reading Per Microgram (galvanometer divisions)	Standard Deviation
Special cuvette	0.5	33.0	6.8	26.2	52.4		
	0.5	38.3	11.5	26.8	53.6		
	0.6	40.0	7.0	33.0	55.0		
	0.9	55.5	7.5	48.0	53.0		
	1.0	65.0	9.9	55.1	55.1		
	1.5	80.0	9.0	72.0	52.0	53.5	1.27
Culture tubes	0.25	18.4	9.2	9.2	36.8		
	0.25	18.2	9.2	9.0	36.0		
	0.5	24.3	6.0	18.3	36.6		
	0.5	32.5	13.2	19.3	38.6		
	1.0	44.1	9.2	34.9	34.9		
	1.0	48.7	10.0	38.7	38.7		
	1.0	48.8	11.5	37.3	37.3		
	1.5	73.0	17.5	55.5	37.0	36.9	1.35
18-mm. test tubes	0.25	14.0	7.0	7.0	28.0		
	0.5	22.0	8.0	14.0	28.0		
	0.5	24.0	10.0	14.0	28.0		
	0.6	25.5	9.0	16.5	27.5		
	1.0	34.0	7.0	27.0	27.0		
	1.0	35.0	7.0	28.0	28.0		
	1.5	52.7	10.0	42.7	28.5		
	2.0	67.0	10.0	57.0	28.5	28.0	0.5
15-mm. test tubes	0.5	19.5	8.0	11.5	23.0		
	0.5	28.8	17.2	11.6	23.2		
	0.9	25.5	6.0	19.5	21.6		
	0.9	26.3	6.3	20.0	22.0		
	0.9	25.0	6.1	18.9	21.0		
	0.6	18.0	5.5	12.5	20.8		
	1.0	30.0	7.2	22.8	22.8		
	1.0	29.8	8.3	21.5	21.5		
	1.5	36.3	6.3	30.0	20.0	22.0	0.98

In Table 3 are recorded data on a series of standard thiamine solutions prepared by a member of the College Park Fishery Technological Laboratory, the concentrations of which were unknown to the writer. The results obtained with the matched 15-mm. tubes, culture tubes, and special cuvettes are expressed in terms of micrograms of thiamine found, and are compared with micrograms of thiamine present in 5 ml. of solution. At the time that these data were obtained the matched 18 mm.-test tubes were not available.

SUMMARY

No instrumental difficulties are introduced by using Pyrex test tubes or culture tubes as solution cells with the Pfaltz and Bauer photoelectric fluorophotometer for fluorometric measurements (5 and 6). It also appears evident that a reasonable degree of precision and reproducibility of results can be readily attained; and that, in the case of the thiochrome assay, a straight line relationship between thiamine concentration and reading is maintained throughout the range of concentration normally encountered. It is further apparent that there is no particular difficulty in obtaining a supply of suitably matched tubes which yield consistent results over a considerable range of instrument sensitivity.

The oval-shaped culture tubes provided both the convenience of test tubes, and a greater sensitivity in terms of galvanometer deflection per microgram of thiamine. Therefore, this type of tube was used chiefly in subsequent work involving a considerable number of assays of extracts of fishery products. The regular cuvettes were used to check the results of an appropriate number of these assays.

Table 3 - Assay of "Unknown" Concentrations of Thiamine, Using Test, and Culture Tubes as Solution Cells (Micrograms Thiamine per Aliquot)

Sample	Amount Present	Amount Found*		
		Special Cuvettes	15-mm. Test Tubes	Culture Tubes
A	1.50	1.51	1.50	1.52
B	0.90	0.95	0.94	0.92
C	1.10	1.09	1.09	1.12
D	1.90	1.92	1.92	1.91
E	0.60	0.60	0.60	0.60
X	0.70	0.69	0.70	0.70

*The values are the averages of the results of at least four assays, in each case.

From these latter results, together with those summarized in this article, it was concluded that, at least for practical purposes, matched test tubes may be used to advantage with the Pfaltz and Bauer instrument for fluorometric assays in place of of the plane-sided cuvettes. The desirability of having available a number of the latter for control and calibration purposes is, of course, obvious.

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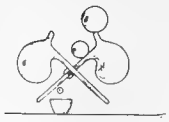


FLOUNDER BIRDS

2 pounds flounder fillets
1 teaspoon salt
1/8 teaspoon pepper

Bread stuffing
4 tablespoons melted butter or other fat
3 slices bacon (optional)

Remove skin from fillets. Sprinkle both sides with salt, pepper. Place a small ball of stuffing on each piece of fish. Roll fish around stuffing and fasten with toothpicks or skewers. Place rolls on a well greased baking pan. Brush tops with melted fat and lay $\frac{1}{2}$ slice of bacon on the top of each. Bake in a moderate oven 350° F. for 25 to 35 minutes depending on size. Remove carefully to a hot platter, take out fastenings, garnish and serve hot. Serves 6.

Sole or other small fillets may be used for the above recipe.

June 1949

Boston, Mass.

Crystals recovered from a broth culture of a Gram variable, aerobic, non-spore forming, small rod bacteria were positively identified as a somewhat unusual form of struvite (magnesium ammoniumphosphate). Of the approximately 400 bacterial cultures isolated from fish, almost all have shown crystal production in culture media to a greater or lesser extent.

College Park, Md.

After seven months of storage, striped bass fillets held at a constant temperature of -10° and 0° F., and at temperatures fluctuating between these two points, received satisfactory scores. The scores are essentially the same for the three groups and practically no change has occurred since the previous month.

* * *

Fillets held at a constant temperature of 15° F. and at temperatures fluctuating between 0° and 15° F. have decreased considerably in quality. Those undergoing temperature changes have received the higher scores, however. The quantity of drip upon thawing for all groups has remained comparatively constant.

* * *

After two months of storage at 0° F., fillets coated with the pectinate film lost 35.4 percent in weight and those having the ice glaze lost 41.8 percent. Both lots obviously had an extremely dried-out appearance and would be unacceptable commercially. The pectinate film became white and fibrous after a short time in storage which would seemingly detract greatly from sales appeal.

* * *

The pan-dressed fish covered with different wrapping and glazing combinations have shown no changes in quality after three months of storage. Weight losses have been negligible.

Ketchikan, Alaska

Heavy concentrations of red water occurred several different times during June in many places in southeastern Alaska. A member of the Hooper Medical Research Foundation arrived at Ketchikan at the middle of the month to spend part of the summer investigating the red water plankton of this area. Samples of red

water were found to contain high concentrations of Noctiluca, Peridinium, Dinophysis, and Ceratium. A very few Gonyaulax catenella were found in a few of the water samples.

Seattle, Wash.

Further tests were carried out on solvent extraction to determine the best method of analytical determination of the oil and vitamin A content of fish livers. Results show that the analytical extraction with ethyl ether removes from the livers other substances than true oil or fat. Petroleum ether does not penetrate the liver material as does ethyl ether. Previous work with fish meal indicated that solvents which are entirely non-missible with water do not give good extraction of oil.

* * *

The thiamine content was determined on raw beef liver, raw yellowfin tuna liver, raw albacore tuna liver, and of eight meals made from these various livers by three different processes of dehydration, namely vacuum drying with the aid of heat at 100° F., vacuum-freeze drying, and acetone extraction dehydration. Vacuum-freeze drying was least destructive of thiamin and meals prepared by this process would be rich food sources of this vitamin. Vacuum drying at 100° F. of the raw liver appeared to reduce the thiamin content by about 50 percent. Acetone extraction reduced the thiamin content in the beef liver meal 50 percent greater than vacuum-freeze drying, and in the case of yellowfin tuna, no thiamin could be detected in the acetone extracted meal. Albacore tuna meal prepared by acetone extraction contained only 20 percent of the thiamine content of the meal prepared by vacuum-freeze drying.

THE BLUE CRAB (CALLINECTES SAPIDUS)

Blue crabs have an extensive range along the Atlantic coast--from Massachusetts at least to the northern part of South America. They are animals of the shallow bays, sounds, and river channels, seldom found far out at sea, sometimes reported in fresh water. In summer, the crabs live close inshore, but in winter move off into deeper water to escape the cold. They do not appear to migrate extensively up and down the coast; probably each section has its own local population.

The blue crab resources of the Atlantic coast yield nearly 80 million pounds annually, of which 60 percent is taken in the waters from New York to North Carolina. Chesapeake Bay is the chief source of crabs, yielding about 42 million pounds annually.

-- Fishery Leaflet 282

Additions to the Fleet of U. S. Fishing Vessels

A total of 141 vessels of 5 net tons and over received their first documents as fishing craft during May 1949—7 more than in April 1948, according to the Bureau of Customs of the Treasury Department. Washington led with 31 vessels, followed by Alaska with 24, and California with 21. During the first five months of 1949, 401 vessels were documented compared with 427 during the same period in 1948.

Vessels Obtaining Their First Documents as Fishing Craft, May 1949

Section	May		Five mos. ending with May		Total
	1949	1948	1949	1948	1948
	Number	Number	Number	Number	Number
New England	8	10	11	20	52
Middle Atlantic	4	5	25	18	40
Chesapeake Bay	10	3	27	14	59
South Atlantic and Gulf	34	57	142	180	541
Pacific Coast	56	39	108	130	347
Great Lakes	4	4	25	18	51
Alaska	24	14	60	42	81
Hawaii	1	2	3	5	12
Total	141	134	401	427	1,183

Note: Vessels have been assigned to the various sections on the basis of their home port.

ECA Procurement Authorizations for Fishery Products

The procurement authorizations for commodities and raw materials announced during July 1949 by the Economic Cooperation Administration included $550,000 for the purchase of fishery products (all from the United States and Possessions), compared with $300,000 during June 1949. Of the total amount authorized ($34,021,911) for purchases of fishery products under the ECA program for the 16-month period through July 31, 1949, $9,059,800 was for purchases in the United States and Possessions.

During the month, ECA announced a decrease of $62,000 in an authorization of $162,000 approved in April 1949 for the purchase of fish oil from the United States and Possessions for delivery to Korea; a decrease of $1,000 in an authorization of $391,000 approved in November 1948 for the purchase of fish meal from Canada for delivery to Denmark. These reductions do not represent a decrease in quantity, but rather an adjustment in value. In addition, a decrease of $75,000 was made in an original authorization of $300,000 (later reduced to $200,000) approved in March 1949 for the purchase of canned fish from the United States and Possessions for shipment to Belgium and Luxembourg.

A new type of procurement authorization is being issued to Marshall Plan countries since July 14 which lists a terminal date for the delivery of ECA-financed goods instead of the present calendar delivery quarter. Shipments may be made any time between the issuance of an authorization and the terminal date.

ECA Procurement Authorizations for Fishery Products, July 1949

Product	Country of Origin	Recipient Country[1]	Amount Authorized
Fish, canned	U.S.& Possessions	Belgium-Luxembourg	$ 100,000
" , "	" " "	Ireland	400,000
Fish, mild-cured (salmon)	U.S.& Possessions	Belgium-Luxembourg	50,000
Total for July 1949			550,000
Total ECA Procurement Authorizations for Fishery Products, April 1, 1948 - July 31, 1949			
Fish, canned	U.S.& Possessions & Canada	United Kingdom, Ireland, Greece, Italy, Belgium-Luxembourg	14,382,800
Fish, salted or cured	Newf., Canada & U.S. & Possessions	Italy & Fr. West Indies	5,229,000
Fish meal	Canada, Iceland, Norway, & Angola	Denmark, Austria, & Bizone Germany	3,956,361
Oil, herring	Iceland	Bizone Germany	1,694,000
" , seal	Newfoundland	France	257,600
" , shark liver	Latin America except Argentine & Brazil	France	250,000
" , fish	U.S.& Possessions	Bizone & Fr. Zone of Germany & Korea	425,000
" , technical fish	U.S.	Bizone Germany	100,000
" , whale (includes sperm oil)	Netherlands, Belgium, Norway & U.S.	Austria, Bizone & Fr. Zone of Germany	7,160,150
Vit. A (Commercial grade, for stock feed)	U.S.	Netherlands	567,000
Grand Total Authorized			34,021,911

1/Unless otherwise indicated, the recipient country is the procuring agency, and the government of the participating country or its authorized agents or importers do the purchasing.

On July 7, ECA announced revised procedures for the submission of information by suppliers of Marshall Plan goods. The procedures, which became effective July 1, 1949, and contained in amendments to ECA Regulation 1 governing execution of suppliers' certificates and invoice-and-contract forms, were initiated after suppliers objected to having all details of their transactions, such as commissions paid, generally known.

The Council of the Organization for European Economic Cooperation, on July 2, reached unanimous agreement on the principles upon which the intra-European payments system for 1949-50 shall be based. The Council has directed the Joint Trade and Intra-European Payments Committee of the OEEC to submit to the Council a draft of an Agreement based on these principles. The Council has requested that safeguards be provided in the draft agreement for a healthy expansion of intra-European trade. It is the purpose of this provision to insure the abandonment of those restrictive trade practices which do not correspond to the increasing degree of freedom to be achieved in the payments system for 1949-50. It is the view of ECA that

the principles upon which agreement has been reached make possible an advance towards breaking down the bilateral trade and payments practices which have become so prevalent in the postwar economic relations of the participating countries.

Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, May 1949: Purchases of fresh and frozen fish by the U. S. Army, Navy, Marine Corp, and Air Force for military feeding during May 1949 amounted to 1,234,229 pounds (valued at $393,676). This was slightly less than in April 1948 when 1,386,475 pounds ($487,851) were purchased, and a little below the May 1948 total of 1,261,261 pounds ($429,774). Purchases for the first five months in 1949 totaled 6,574,933 pounds ($2,214,499), compared with 6,514,321 pounds ($2,414,208) for the corresponding period the previous year.

Fishery Biology Notes

"ALBATROSS III": Haddock Tagged on Georges and Browns Banks (Cruise 23): Over 1,200 haddock were tagged on Georges and Browns Banks by the Service's scientists aboard the Albatross III during June 23-29. This is the first large-scale haddock tagging operation accomplished on any of the important offshore banks. The purpose of this work was twofold: first, to determine whether haddock which pass through the meshes of the recommended large-mesh cod end will actually survive to a more marketable size; second, to learn more about the migration of the fish on these banks.

The fish were tagged by attaching two celluloid discs, one red and one white, to the left gill cover. The white discs were numbered serially, so that each fish was measured and its physical condition noted. A reward of $1.00 will be paid to any person finding one of these tags and returning it to the Fish and Wildlife Service. Information on the exact location where the fish was caught and its length, returned with the tag, is desired. Fishermen have been advised to be on the lookout for these tagged fish, as the success of the experiment depends on the number returned.

Data from these tagging experiments will enable the scientists to determine the practicability of using nets with larger mesh to save many small fish and to study the movements of the haddock over the banks and between the banks.

Study of the Escapement of Fish Through Larger-Meshed Nets (Cruise 24): A series of experiments to study the escapement of fish through larger-meshed nets were started aboard the Service's research vessel during July 11-19. The purpose of this study was to find ways of saving the large number of small fish which are destroyed by commercial fishing. It has been estimated that over 13,000,000 haddock alone are destroyed. If these fish had been left another year, approximately 18,000,000 pounds of edible fish food would have been added to the nation's supply.

The studies were made to determine the number and size of all marketable kinds of fish that would escape through meshes 1 to 1½ inches larger than the mesh in present use. The Albatross III made alternate tows, first with a net of regular commercial mesh and then with a net of the larger mesh. The number of fish caught

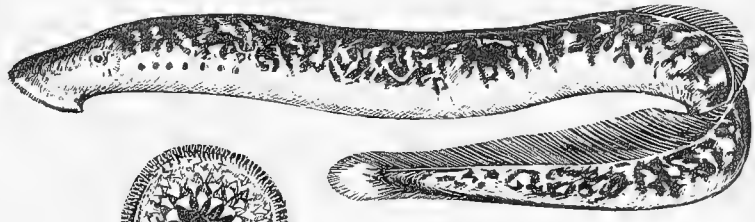
and the size of these fish were determined by the biologists. All the more important species of fish were caught, including haddock, cod, rosefish, yellowtail, and hake. Observations were made on various parts of Georges Bank and in the South Channel area. The data collected are now being analyzed to determine the precent of each size of fish that escape and to relate these to the commercially-acceptable sizes and weights.

Demonstration Cruise (Cruise 25): The Albatross III made a demonstration cruise from Boston, Mass., on July 21. The purpose of the cruise was to acquaint members of the fishing industry and other interested conservation officials with the vessel, its methods, and the program of research used by the North Atlantic Fishery Investigations.

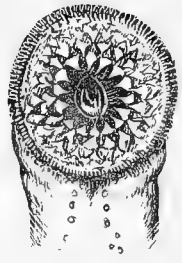
GULF OYSTER INVESTIGATIONS: The Chief of the Service's Gulf Oyster Investigations, Pensacola, Florida, reported in July that the experiences of the past few months have helped to select certain broad objectives for the future program of the laboratory. These goals are:

1. Investigation of the ecology of the conch, Thais, in an effort to obtain more effective means of control;
2. Studies on certain parasites of oysters, such as clams, sponges, Polydora and protozoans, to determine their economic importance;
3. Determination of local setting and growing rates in conjunction with physical and hydrographic surveys in order to rehabilitate local oyster reefs which are now nearly barren;
4. Studies on the morphogenesis of oysters with the objective of creating selective strains;
5. Continued studies in the area affected by the Bonne Carre Spillway to localize the hydrographic factors responsible for mortalities and low growth rates;
6. Continued assistance to the Conservation Departments of the Gulf States in developing their oyster culture practices.

PERCENTAGE OF LAKE MICHIGAN LAKE TROUT SCARRED BY LAMPREYS: The Service's Fishery Research Biologist stationed at Ann Arbor, Michigan, has just completed his analysis of the 1948 data supplied by commercial fishermen of the State of Michigan waters of Lake Michigan on the percentage of scarred fish in their catches. His analysis reveals that the percentage by weight of lake trout of marketable size bearing sea lamprey scars increased from 31 in 1947 to 41 in 1948.



SEA LAMPREY
(Petromyzon marinus)



Mouth of Sea Lamprey

THE SEA LAMPREY, WHICH FEEDS ON THE BLOOD AND FLESH OF FISH, IS PREYING ON THE LAKE TROUT OF THE GREAT LAKES AND IS THREATENING THAT FISHERY.

PRELIMINARY REPORT ON TUNA FISHING TRIP OFF CENTRAL AMERICA

(APRIL 23-JUNE 9, 1949)

INTRODUCTION: In the spring of 1949, a trip was planned to provide more field data on Pacific tuna for life-history and population studies. Accordingly, a cruise was made on the tuna clipper M/V Alphecca through the courtesy of a West Coast tuna canner and the ship's master.

The Alphecca is a 128-foot wooden-hulled vessel (ex-Navy YP) capable of carrying 260 tons of fish, and on this trip carried nine fishermen, in addition to the skipper, the engineer, and the cook.

Although the cruise was from April 23 to June 9, the actual fishing was confined to the month of May, and nearly 250 tons of fish, primarily yellowfin, were brought aboard. The methods of fishing, catching and caring for bait, maintenance of the ship, and so on were essentially the same as those described by Godsil (Calif. Div. Fish & Game, Fish Bull. No. 51).

BAIT FISHING AND HANDLING: Since the Alphecca planned to fish south of the Gulf of California in waters warmer than 75° F., anchovettas were chosen for bait. Bait was taken at Macapule, Mexico, a sandy beach on the mainland side of the Gulf of California a hundred or so miles in from the mouth, (25° 20' N. Lat., 108° 39' W. Long.). Bait was plentiful and easily located near boils of mud and sand and an occasional jumping fish. In three days, 3,600 scoops of bait had been brought aboard. On the evening of the third day, the Alphecca set out for the fishing grounds further south. The bait began milling immediately in the tanks. The mortality throughout the trip was not excessive. The dead were siphoned off the bottom daily for a short period, and the floating dead were continually removed with a dip net. The fish were fed ground tuna or skipjack every few days from May 21, the first successful day of fishing, to May 28, three days before the last anchovetta was gone. As the brine wells were needed for tuna, the bait was transferred, scoop by scoop, to the bait tanks. On the morning of the last day of fishing, 150 scoops were transferred to another boat. That evening the remaining 150 to 200 scoops went over the side to provide space for the 25 tons of fish on deck.

TUNA FISHING: The principal area fished was centered approximately 140 miles off the coast of El Salvador. The catch in this area was composed almost exclusively of two-pole yellowfin, i.e., yellowfin from 30 to 100 pounds. These schools were most often found under porpoise of the type fittingly called "spinners" by the fishermen. The porpoise jumped ten or fifteen feet in the air, spinning as they went. Schools of porpoise and fish were often immense. Birds were usually seen working over the fish, but they were scattered and not numerous.

Twice the Alphecca left this area, proceeding northward to waters forty to sixty miles off central Nicaragua. Here the fish were smaller; one-pole yellowfin and oceanic skipjack. Few porpoise were seen in this area, and the schools were located by the presence of birds or by ripples in the water.

BIOLOGICAL DATA OBTAINED: Morphometric data were taken on 40 yellowfin ranging in total length from 399 mm. to 1568 mm. (15½-62 inches). The size of the six oceanic skipjack measured was from 507 mm. to 669 mm. (20-25 inches). One 545 mm. black skipjack was measured. Most of the fish taken for measurements had broken keels and frayed fins. Scale samples were taken from each yellowfin measured.

Owing to the speed with which fish were stowed in the wells, it was impossible to secure length measurements of 50 fish from each school.

A series of smaller yellowfin tuna and oceanic skipjack were preserved.

The gonads of at least ten fish per week were examined. Generally speaking, the males of both oceanic skipjack and yellowfin tuna were ripe. Testes were firm, usually with milt running in the central duct. During the last two weeks of May, several large male (over 1350 mm. total length) yellowfin were observed to be turning ripe. The gonads from three female oceanic skipjack taken in the middle of May were completely spawned out. The ovaries were enlarged, hollow, and flabby. Ovaries of the remaining female oceanic skipjack and yellowfin tuna were firm but not turgid, and hollow with no ova visible. Apparently they were about to enter or were just past the ripe or running-ripe condition. Surface plankton hauls were made whenever possible in areas where these fish were taken, but no eggs or juveniles were taken in the net.

COLLECTION OF SPECIMENS: Fourteen night-light fishing stations were occupied. Collecting began soon after dark and lasted from two to four hours. Large squid were usually present during these periods and often caused the collections to be rather meager. They formed a hemisphere around the light and fed on fish or the larger invertebrate material that collected around the light. From five of these stations in both fishing areas, series of fish were taken which are externally strikingly similar to the juvenile yellowfin tuna and juvenile oceanic skipjack described from specimens taken 200 miles further south on the Central American coast by Schaefer and Marr (U. S. Fish & Wildlife Service, Fishery Bulletin No. 44). Positive identification awaits a more critical examination. Also still in need of a more positive identification is a series resembling juvenile frigate mackerel as described by Schaefer and Marr, (Pacific Science, October 1948). These are present in most of the collections. The number of species in these collections will probably be between 15 and 20.

FEEDING OF TUNA: Material taken from stomachs or regurgitated on deck by tuna included squid, crustacea, and small fishes. The tuna were often seen feeding on flying fish, sometimes catching them in mid-air. At such times few fish could be held near the boat with anchovettas and the fishing was generally slow. Flying fish were recovered from the mouths and stomachs of the few taken. The deck hose was found to be a handy tool for washing out stomachs.

—Giles W. Mead, Jr.

PROGRAM OF THE N.C. INSTITUTE OF FISHERIES RESEARCH

The program of the North Carolina Institute of Fisheries Research was outlined in its Third Semi-Annual Report which covers the period from July 1 to December 31, 1948. The program consists of scientific research, technological research, cooperation with other agencies, and education.

Under scientific research, some work has already been done on a survey of the ocean bottom off the North Carolina coast to ascertain the types of bottom suitable for shrimp trawling and the areas where shrimp are found. As a result of this project, charts containing this data have been made for the fishermen in the Southport area. Offshore commercial fishing trawlers have been cooperating by reporting the absence or presence of shrimp on the offshore fishing grounds.

Besides the study of offshore shrimping grounds, an investigation of inshore waters for shrimp as well as fish has been started. Rate of growth, precentage of the different species of shrimp in the commercial catch, percentage of shrimp captured below the commercial size, the time of local appearance, and sex ratio are being studied. The Institute failed to develop any evidence pointing to the need of restractive measures so far as conservation is concerned. It has definite evidence that, at least as far as last season is concerned, there is no dependence upon the sound shrimp by the ocean shrimp.

Shellfish investigations have been outlined to cover the following:

1. Suitability of bottoms as oyster planting areas;
2. Studies of the spawning, setting and growth rates of oysters;
3. The natural enemies of oysters in North Carolina waters;
4. Utilization of the heavy set in the Beaufort-Morehead area to supply seed for localities in Pamlico Sound;
5. Studies on the spawning, setting and growth rates of clams;
6. Research on the digestive process of oysters and clams;
7. A survey to determine the presence and abundance of the the various molluscs which are of commercial importance to other areas.

The program on finfish has not yet been well defined. Data on sizes, species, seasons, water salinity and temperatures are being collected on the offshore fishing grounds. The destruction of small fish by trawlers is under investigation, and concurrently a census will be taken of immature fish of commercial significance which are found in the sounds. The fishing of sturgeon, which has been banned in the Cape Fear River for several years, was under study in 1948 and further observations are planned for 1949.

The technological investigations are divided between a study of marketing methods used in North Carolina, net deterioration, and experimental gear work. The study on marketing includes the methods of handling fish and shellfish in local wholesale and retail markets, channels of distribution, sales methods, types of packages used, and consumer demand.

The Institute has been cooperating with other State agencies as well as with the Federal Government on shad migration investigations, study of offshore oceanographic conditions, and the compilation of a list of all published references on North Carolina's commercial fish and shellfish.

Under education, the Institute expects to aid:

1. High schools, by furnishing information, pictures, and slides on the types of marine life found in the State;
2. Colleges, by loaning its facilities for research work and for collecting;
3. Fishermen, by demonstration of net or gear assembly and mending.

REPORT OF PACIFIC OCEANIC FISHERY INVESTIGATIONS, JUNE 1949

AKU ABUNDANT IN JUNE IN MARIANAS: Aku were abundant during June near Saipan and Tinian Islands in the Marianas, according to information released in Honolulu July 25 by POFI of the Service. Two small sampans now fishing at Saipan were able to land as much as 10,000 pounds per day during June. In July 1946, an average of approximately 3,000 pounds per boat per day were caught.

A biologist of the staff found on a recent trip to the Marianas that there is no fish processing industry in that area at the present time. Fishing is done to supply the fresh market only. Plans are being made by Saipan residents to initiate a small canning venture in the future so that a larger portion of the rich fisheries resources of the central Pacific may be utilized.

COLLECTION OF JAPANESE TUNA LITERATURE: The program of collecting Japanese scientific papers dealing with research into tuna fishing and the habits of tuna has been virtually completed.

Much of the material was obtained in Japan by a POFI reconnaissance team while working under the auspices of SCAP, and the remainder came from U. S. Navy projects and the U. S. Fish and Wildlife Service's library in Washington, D. C. The collection, which will remain in Honolulu, is believed to be the most complete outside of Japan. Such material as will be of value to research and industry will be translated by the POFI staff.

SERVICE FILM CHOSEN FOR INTERNATIONAL CINEMATOGRAPHIC ART EXHIBITION

The newest Fish and Wildlife Service film, It's the Maine Sardine (16 mm. sound color), has been entered in International competition at the 10th International Exhibition of Cinematographic Art, the Department of the Interior anncunced on June 28. This film, produced by the Service in cooperation with the Maine Department of Sea and Shore Fisheries and the Maine Sardine Packers Association, depicts the catching of sardines off the Maine coast and the packing processes used in local canneries.

The selection was among the 13 made by the Department of State's Motion Picture Review Committee from more than 500 Government educational films. Another Interior film, California and Its Natural Resources, also was chosen.

Sponsored by the Italian Government, the Exhibition will be held in Venice, August 11-September 1. About 20 countries besides the U. S. will be represented.

USE OF CALIFORNIA SARDINES FOR REDUCTION PURPOSES LIMITED

California sardine processors will not only operate during the 1949-50 season under the lowest reduction quota in State history, but may find the percentage allocation a further deterrent to reducing whole fish into oil, meal, and pet food, according to the June 29 Outdoor California of the California Division of Fish and Game.

At their June meeting in Los Angeles, fish and game commissioners allowed 80 percent of the stringent 50,000-ton reduction quota to straight reduction plants, and 20 percent, or 10,000 tons, to reduction plants operated in connection with food canneries.

The allocation for the coming season (the sardine season opens August 1) is now in effect.

Setting of sardine reduction rules is the Commission's only regulatory power over the sardine industry. A legislative law also requires that at least 13½ cases of sardines be packed for human food use from each ton of fish processed.

U.S. PACK OF CANNED ANCHOVIES, 1948

The 1948 pack of canned anchovies amounted to 66,994 standard cases valued at $755,458 to the packers. Compared with the previous year, this was a decline of 49 percent in volume and 45 percent in value. The entire 1948 pack was canned by 23 firms in the Monterey and San Pedro district of California. Canning of anchovies in California is of recent origin. The packing of these fish was undertaken in 1947 as a result of the pilchard fishery. In that year, the California pack, and that of one firm in Washington, amounted to 130,119 standard cases, valued at $1,377,275.

Table 1 - Pack of Canned Anchovies by Size of Can & Case, 1948
(Quantity & Value to Canners)

State & Can Size	Actual Cases	Value
California:		
8 ozs. net (48 cans) ...	59,897	$317,224
8 ozs. net (96 cans) ...	19,965	272,641
16 ozs. net (48 cans) ...	1/17,081	1/165,593
Total, actual cases ...	96,943	755,458
Total, std. cases	66,994	755,458

1/Includes a small pack of cans containing 4 ozs. each, packed 48 cans to the case.
Note: Standard cases represent the pack of 48 cans of 16 ozs. each.

Table 2 - Pack of Canned Anchovies by Style of Pack, 1948
(Quantity & Value to Canners)

Style of Pack	Std. Cases	Value
Natural	44,808	$529,683
In tomato sauce ..	22,186	225,775
Total	66,994	755,458

U.S. PACK OF CANNED ANIMAL FOOD FROM FISHERY PRODUCTS, 1948

The 1948 pack of fishery products for animal food amounted to 1,323,808 standard cases, valued at $6,971,003 to the canner. Compared with the previous year, this was an increase of 45 percent in volume and 77 percent in value. The 1948 pack was the largest and most valuable in histroy. Nearly 60 percent of the production was canned in California and all but 1 percent of the remainder in Maine and Massachusetts. Animal food was canned in 6 plants in Massachusetts, 2 plants each in Maine and Washington, 1 plant each in New York and Virginia, and 4 plants in California.

Table 1 - Pack of Canned Animal Food from Fishery Products, 1948
(Quantity & Value to Canners)

State	Std. Cases	Value
Me. & N. Y.	292,381	$1,728,401
Mass.	259,964	1,130,035
Va. & Wash.	9,903	30,700
Calif.	761,560	4,081,867
Total	1,323,808	6,971,003

Note: "Standard cases" represent the various-sized cases converted to the equivalent of 48 cans, each containing 16 ounces.

Table 2 - Pack of Canned Animal Food from Fishery Products, 1948 (By Size of Can & Case--Quantity & Value to Canners)

Size of Can and Case	Actual Cases	Value
8 ozs. net (48 cans) ...	1,510,769	$4,417,523
15½ ozs. net (48 cans) .	63,887	218,105
16 ozs. net (48 cans) ..	345,656	1,666,303
Other sizes (std. cases).	160,876	669,072
Total	2,081,188	6,971,003

Table 3 - Pack of Canned Animal Food from Fishery Products, 1939-1948 (Quantity & Value to Canners)

Year	Std. Cases	Price Per Std. Case	Total Value
1948	1,323,808	5.27	$6,971,003
1947	909,964	4.34	3,949,419
1946	-	-	-
1945	-	-	-
1944	-	-	-
1943	1,771	3.00	5,319
1942	104,954	3.57	374,718
1941	1,009,515	2.60	2,624,487
1940	721,732	2.58	1,861,638
1939	566,673	1.96	1,109,112

U.S. PACK OF CANNED FISH ROE AND CAVIAR, 1948

The domestic pack of canned fish roe and caviar in 1948 amounted to 50,629 standard cases (48 one-pound cans), valued at $1,473,320 to the packer. This was a decline of 3 percent in volume and 10 percent in value compared with the previous

Table 1 - Pack of Canned Fish Roe and Caviar, 1948 (Quantity and Value to Canner)

Product	Standard Cases	Price Per Std. Case	Total Value	States In Which Produced and Number of Plants
Roe:				
Alewife	22,658	$17.72	$ 401,416	Md. 7, Va. 14, N. C. 9
Herring	3,478	10.32	35,883	Me. 2, Mass. 1
Mackerel	6,574	14.66	96,370	Mass. 4, Md. 3
Shad	3,075	67.67	208,079	Md. 1, Va. 1, Fla. 1, Wash. 1, Ore. 7, Calif. 2
Misc., incl. trout, pollock, yellowtail, and menhaden	2,606	17.45	45,466	Mass. 1, Va. 1, N. C. 1
Caviar:				
Whitefish	2,389	45.09	107,710	N. Y. 4, Wisc. 1
Misc., incl. salmon, sturgeon and carp	2,310	180.80	417,640	N. Y. 2, Va. 1
Total edible roe and caviar	43,090	30.46	1,312,564	
Salmon eggs (for bait) ...	7,539	21.32	160,756	Wash. 5, Ore. 1
Grand total	50,629	29.10	1,473,320	

Note: "Standard cases" represent the various-sized cases converted to the equivalent of 48 cans of 16 ozs. each.

year. Alewife roe accounted for nearly half the total pack, and over one-fourth of the value. Although the volume of the New York pack was less than in many of the states, the value was much greater due to the high value of the whitefish, salmon, and sturgeon caviar canned in that State.

Table 2 - Pack of Canned Fish Roe & Caviar, By States, 1948 (Quantity & Value to Canner)

State	No. of Plants Exclusive of Duplication	Standard Cases	Value
			$
Maine	2	11,430	159,772
Mass.	5		
N. Y.	4	3,541	463,534
Md.	7	7,572	175,307
Va.	14	14,371	259,638
N. C.	9	2,555	46,633
Fla.	1		
Wisc.	1	1,367	72,553
Calif.	2		
Wash.	6	7,501	159,166
Ore.	8	2,292	136,717
Total ..	59	50,629	1,473,320

Table 3 - Pack of Canned Fish Roe & Caviar, 1939-1948 (Quantity & Value to Canner)

Year	Std. Cases	Price Per Std. Case	Total Value
1948	50,629	$29.10	$1,473,320
1947	52,432	31.30	1,641,228
1946	58,192	32.75	1,905,638
1945	36,795	25.77	948,042
1944	55,677	14.80	824,197
1943	59,884	17.44	1,044,582
1942	53,190	17.13	910,890
1941	76,740	10.63	815,514
1940	61,852	14.42	891,814
1939	64,448	14.86	957,875

U.S. PRODUCTION OF MARINE ANIMAL OILS, 1948

The 1948 United States and Alaska production of marine-animal oils amounted to 17,045,390 gallons, valued at $30,861,522 to the producers. This was an in-

Table 1 - Production of Marine-Animal Oils, 1948 (Quantity & Value to Producers)

Item	Atlantic and Gulf Coasts[1]		Pacific Coast (including Alaska)		Total	
	Gallons	$ Value	Gallons	$ Value	Gallons	$ Value
From Body and Waste of:						
Anchovy	-	-	15,407	15,320	15,407	15,320
Fur seal	-	-	47,711	42,484	47,711	42,484
Herring	90,548	74,681	3,541,267	3,918,173	3,631,815	3,992,854
Menhaden	8,763,939	10,132,179	-	-	8,763,939	10,132,179
Pilchard	-	-	2,328,572	2,457,858	2,328,572	2,457,858
Salmon:						
Edible	-	-	22,065	77,228	22,065	77,228
Industrial	-	-	94,264	93,150	94,264	93,150
Tuna and mackerel .	-	-	660,515	622,110	660,515	622,110
Whale:						
Sperm	-	-	62,332	66,071	62,332	66,071
Other	2,650	2,427	55,107	61,719	57,757	64,146
Miscellaneous[2]	[2] 508,869	742,374	[2] 129,815	144,096	638,684	886,470
Total	9,366,006	10,951,661	6,957,055	7,498,209	16,323,061	18,449,870
From Livers and Viscera of:						
Cod	196,685	529,426	-	-	196,685	529,426
Shark	[3]	[3]	[3] 434,010	[3] 6,315,232	434,010	6,315,232
Tuna	[3]	[3]	[3] 25,379	[3] 1,080,241	25,379	1,080,241
Miscellaneous	[4] 1,709	[4] 83,286	[4] 64,546	[4] 4,403,467	66,255	4,486,753
Total	198,394	612,712	523,935	11,798,940	722,329	12,411,652
Grand Total	9,564,400	11,564,373	7,480,990	19,297,149	17,045,390	30,861,522

1/Includes a small production of burbot liver and unclassified body oils in Minnesota.
2/Includes the production of alewife, rosefish and unclassified body oils on the East Coast; and unclassified body oils on the West Coast.
3/East and West Coast production combined.
4/Includes the production of burbot, halibut, rockfish and swordfish liver oils on the East Coast; and halibut, lingcod, sablefish, mixed liver oils and viscera oils on the West Coast.

Table 2 - Production of Marine-Animal Oils, 1939-48 (Quantity & Value to Producers)

Year	Body Oils			Liver Oils			Total		
	Gallons	Price Per Gallon	Value	Gallons	Price Per Gallon	Value	Gallons	Price Per Gallon	Value
1948	16,323,061	$1.13	$18,449,870	722,329	$17.18	$12,411,652	17,045,390	$1.81	$30,861,522
1947	15,900,382	1.26	20,107,194	832,510	13.99	11,643,468	16,732,892	1.90	31,750,662
1946	19,135,051	1.11	21,223,098	895,884	15.20	13,618,549	20,030,935	1.72	34,841,647
1945	23,697,564	0.68	16,033,515	804,288	13.93	11,202,207	24,501,852	1.11	27,235,722
1944	27,324,173	0.65	17,771,346	998,802	13.25	13,237,435	28,322,975	1.09	31,008,781
1943	22,264,362	0.67	14,970,884	851,854	17.42	14,841,970	23,116,216	1.29	29,812,854
1942	19,549,283	0.64	12,516,206	1,029,821	9.77	10,061,396	20,579,104	1.10	22,579,602
1941	28,045,869	0.52	14,719,628	1,237,758	12.02	14,874,586	29,283,627	1.01	29,594,214
1940	24,023,661	0.29	6,936,608	791,877	6.43	5,088,570	24,815,538	0.49	12,025,178
1939	35,064,420	0.29	10,221,407	687,693	6.51	4,475,662	35,752,113	0.41	14,697,069

crease of 2 percent in volume, but a decline of 3 percent in value compared with the previous year. Menhaden oil accounted for over half of the production and nearly one-third of the value; fish liver oils accounted for only 4 percent of the volume, but represented 40 percent of the total value.

U.S. PRODUCTION OF MARINE PEARL-SHELL BUTTONS, 1948

The 1948 production of marine pearl-shell buttons (produced principally from imported shells) amounted to 4,974,073 gross, valued at $8,587,011 to the manufacturers. This was an increase of 44 percent in volume and 52 percent in value compared with 1946, the most recent previous year for which data are available. While the 1948 production of marine pearl-shell buttons was considerably below the normal prewar yield, the value was the largest in histroy. Manufacturers received an average of $1.73 per gross for their 1948 production compared with an average of 58 cents in 1939. Marine pearl-shell buttons were manufactured in 4 plants in New York, 12 in New Jersey, 3 in Connecticut, 2 in Pennsylvania, 1 in Maryland and 2 in Iowa.

Table 1 - U. S. Production of Marine Pearl-Shell Buttons, 1948 1/ (Quantity & Value to Manufacturer)

State	Quantity	Price Per Gross	Total Value
	Gross	$	$
New York	1,358,712	1.66	2,248,887
New Jersey	1,333,384	1.65	2,198,112
Connecticut	1,055,467	1.81	1,914,499
Pa., Md., & Iowa ..	1,226,510	1.81	2,225,513
Total	4,974,073	1.73	8,587,011

1/ Produced principally from imported shells.

Table 2 - U.S. Production of Marine Shell Buttons, 1939-48 (Quantity & Value to Manufacturer)

Year	Quantity	Price Per Gross	Total Value
	Gross	$	$
1948	4,974,073	1.73	8,587,011
1947	1/	-	1/
1946	3,461,559	1.63	5,635,904
1945	2,398,020	1.37	3,286,245
1944	2,035,320	1.28	2,601,626
1943	2,949,978	1.29	3,792,059
1942	5,364,718	.84	4,532,695
1941	7,424,769	.72	5,337,351
1940	6,830,628	.61	4,140,984
1939	7,173,933	.58	4,174,417

1/ Data not available.

U.S. PRODUCTION OF FRESH-WATER MUSSEL-SHELL PRODUCTS, 1948

The 1948 production of fresh-water mussel-shell buttons amounted to 6,810,135 gross, valued at $5,396,511 to the manufacturers. In addition, crushed shell poultry feed, lime and chips, and novelties valued at $50,610 were produced by button manufacturers. While the production of buttons was far below normal, their average value, which amounted to 79 cents per gross, was the highest in history, and was over three times the average price received in 1939.

Table 1 - Production of Fresh-Water Mussel-Shell Products, 1948 (Quantity & Value to Manufacturer)

Product	Unit	Iowa & Missouri		N.Y., Pa., & Ill.		Total	
		Quantity	Value	Quantity	Value	Quantity	Value
Buttons	Gross	5,688,904	$4,261,195	1,121,231	$1,135,316	6,810,135	$5,396,511
Crushed shell poultry feed .	Tons	1/852	1/8,522	1/	1/	852	8,522
Lime	"	1,368	3,678	-	-	1,368	3,678
Chips, shells & novelties ..	-	-	38,410	-	-	-	38,410
Total	-	-	4,311,805	-	1,135,316	-	5,447,121

1/A small production in New York has been included with that in Iowa and Missouri.

Table 2 - U. S. Production of Fresh-Water Mussel-Shell Products, 1939-48 (Quantity & Value to Manufacturer)

Year	Buttons			Other Products 1/	Total
	Gross	Price Per Gross	Value	Value	Value
1948	6,810,135	$0.79	$5,396,511	$ 50,610	$5,447,121
1947	3/	-	3/	3/	3/
1946	9,669,580	0.68	6,527,758	101,820	6,629,578
1945	2/9,027,685	0.54	2/4,844,647	-	2/4,844,647
1944	8,024,609	0.54	4,306,353	122,550	4,428,903
1943	8,077,525	0.46	3,679,305	102,723	3,782,028
1942	11,585,292	0.43	4,980,476	83,795	5,064,271
1941	10,020,499	0.30	2,971,547	65,803	3,037,350
1940	8,860,113	0.27	2,434,257	55,181	2,489,438
1939	10,139,382	0.24	2,428,994	63,348	2,492,342

1/Crushed shell poultry feed, lime, chips, etc.
2/Estimated.
3/Data not available.

Mussel shells purchased during the year amounted to 9,657 tons, valued at $452,343. Shells were taken in 13 states in the Mississippi River and Great Lakes region. The producing states in the order of their importance were: Tennessee, which contributed 40 percent of the total quantity; Kentucky, 23 percent; Alabama, 19 percent; Indiana, 8 percent; Arkansas, 5 percent; Illinois, 4 percent; and Iowa, Michigan, Minnesota, Missouri, Ohio, South Dakota and Texas, 1 percent.

WHOLESALE AND RETAIL PRICES

As of June 14, 1949, the wholesale index for all commodities continued to drop and was 0.8 percent lower than on May 17 this year, and 6.5 percent lower than on June 15 last year, according to the Bureau of Labor Statistics of the Department of Labor. All foods, however, increased slightly and the index was 0.2 percent higher than on May 17 this year, but was still 9.4 percent lower than on June 15, 1948.

There was a big drop in the canned salmon wholesale prices during June due to attempts by wholesalers to clean up their stocks of the 1948 pack. Pink canned

salmon prices were 21.8 percent below May and 15.9 percent lower than in June 1948. Canned red salmon prices were 9.6 percent lower than in May this year and June last year.

Wholesale and Retail Prices

Item	Unit		Percentage change from--	
Wholesale: (1926 = 100)		June 14,1949	May 17,1949	June 15,1948
All commodities	Index No.	154.8	- 0.8	- 6.5
Foods	do	163.8	+ 0.2	- 9.4
Fish:		June 1949	May 1949	June 1948
Canned salmon, Seattle:				
Pink, No. 1, Tall	$ per doz. cans	4.432	-21.8	-15.9
Red, No. 1, Tall	do	5.787	- 9.6	- 9.6
Cod, cured, large shore, Gloucester, Mass.	$ per 100 lbs.	15.500	0	+ 6.9
Retail: (1935-39 = 100)		June 15,1949	May 15,1949	June 15,1948
All foods	Index No.	204.3	+ 0.9	- 4.6
Fish:				
Fresh, frozen and canned	do	312.6	- 0.9	+ 4.4
Fresh and frozen	do	252.2	- 0.9	+ 0.2
Canned salmon:				
Pink	¢ per lb. can	59.6	- 0.8	+12.0

Retail food prices rose slightly in June and as of June 15 the all-foods index was 0.9 percent higher compared with May 15, but 4.6 percent lower than on June 15 a year ago. Fishery products did not follow the same trend as all foods. The retail index for fresh, frozen, and canned fishery products was 0.9 percent below May 15 this year, but 4.4 percent higher than on June 15, 1948. The fresh and frozen index followed the same trend except that it was only 0.2 percent higher than the corresponding period a year ago. Canned pink salmon retail prices also continued to drop and were 0.8 percent lower than on May 15, but were still 12 percent above June 15 last year.

Argentine Republic

SHARK LIVER OIL INDUSTRY, 1948: It is estimated that the shark catch and the production of vitamin-rich liver oil continued to decline in 1948, according to an April 18 report from the American Embassy at Buenos Aires. Trade sources place the total catch of shark at around 6,000 metric tons as compared with 6,600 tons in 1947. In 1946, the catch was estimated to exceed 10,000 tons.

Production of shark liver oil in 1948 was calculated at 195 metric tons, compared with 250 tons in 1947. This estimate is based on the exports of 181 tons and the domestic use of approximately 12 tons during the past year.

Taking an overall average of 75,000 U. S. P. units per gram, the production would approach the equivalent of around 15 trillion units of vitamin A. The average potency has previously been about 60,000 units per gram, factor 1894. One of the leading shark liver oil exporters states that not only has the potency yield per gram been unusually high for the 1948 catch, but the quality has been exceptionally good. Argentina has recently taken steps to assure the quality of the shark liver oil for exportation.

The southern shark fishing season has been very poor due to difficulties in locating sufficient numbers of sharks. Fishing crews have found it virtually impossible to take paying catches of sharks near Mar del Plata and, as a result, have not only extended their fishing farther south, but have been forced to go as far as 65 miles to sea. The Ministry of Agriculture reports that although strict laws against taking small sharks are in effect, there appears to be a considerable amount of disregard for these regulations by fishing crews.

It is estimated that a total of about 22 metric tons or 1.5 trillion units of shark liver oil was produced during the December 1948-April 1949 period (southern fishing season). Only 60 percent has been traded for export to date, the other 40 percent remaining in the producer's hands.

With the closing of the southern shark season, fishing activities are at a minimum until the Mar del Plata and Pategones season starts around the first week in July. Between April and July only limited quantities of low potency oil, obtained primarily from female sharks taken in the Mar del Plata-Necochea district, will be available.

During 1948, over 180 metric tons were exported as compared with 334 tons

Shark Liver Oil Prices (F.O.B. Buenos Aires) Quoted by Argentine Exporters, Apr. 1949

Potency	Price Per Million Units
	¢
40,000-50,000 units	29
60,000-70,000 "	30½
70,000-80,000 "	31½
80,000-90,000 "	32¼
90,000-100,000 "	33¾

in 1947. The United States and France imported 99.1 and 73.3 tons, respectively, in 1948 as compared with 138.2 and 82.3 tons the previous year.

Local shark liver oil exporters express much concern about the present increased threat of synthetic vitamin production to their business. It is possible that due to the rise in the cost of fishing and general production increases, Argentine exporters may find it difficult to compete with the new low-cost synthetic oil.

SABELO AND OTHER FRESH-WATER FISH OILS AND MEAL: The principal source of fish oil other than that extracted from shark livers is the sabelo (Prochilodus platensis). The trade estimates that a total of around 13,000 metric tons of sabelo (including other fresh-water fish) were processed during 1948 for oil and meal. The 1948 oil yield is reckoned to be around 1,500 tons as compared with 2,005 tons the previous year. Meal production during 1948 will approach 1,700 tons as compared with 2,132 in 1947.

The oil obtained from the sabelo is of the crudest type and is used for tanning purposes. The meal is used for poultry feed or fertilizers. Germany has taken a considerable interest in the oil, importing approximately 900 metric tons in 1948 and a total of 338 tons during the January-February period of 1949. Holland and Ireland accounted for the greater portion of the balance exported during 1948, taking about 500 metric tons.

WHALE OIL AND MEAL: The production of whale oil, guano and meat meal for the 1948-49 season amounted to 67,260 barrels or 11,210 metric tons of oil, 4,261 tons of guano, and 269 tons of meat meal, compared with the 1947 production of 8,849 metric tons of oil, 4,754 tons of guano, and 338 tons of meat meal. Around 50 percent of the 1948-49 whale oil production will be exported to England for margarine, while 25 percent will be sent to Germany, and 25 percent to Denmark. Apparently the total guano and meat meal exports will be devided equally by England and Denmark.

During the 1948-49 season, seven vessels of 400 tons each and two transports of 8,000 tons were used by the Argentine whaling interests.

Late in June 1948 the British Colonial Office granted the principal whaling company in Argentina a 21-year lease in South Georgia Island in the Antartic. As a result of this grant, whaling interests have caused considerable comment in Argentina with elaborate expansion plans. It has been claimed that the company's newly equipped plant located in South Georgia Island, which employs approximately 100 Argentines and 300 Norwegians, coupled with the new 23,000 ton SS Juan Peron presently under construction in England, will be ready by 1950 to boost the output of whale oil, guano and meat meal by about three times the present rate. The new vessel is claimed as the world's largest whale factory ship costing $6,045,000 with an over-all length of 655 feet and will accommodate 27,000 tons of whale oil and associated products. Argentina has also purchased six new killer boats at a cost of $583,750 each to be delivered at the same time as the new vessel.

Australia

TO START WHALING OPERATIONS: The Australian Government has decided to start whaling operations with a shore factory and three chasers at Shark Bay, according

to the April 1949 Fisheries Newsletter of the Commonwealth Director of Fisheries. This will enable Australia not only to meet all her own requirements of whale oil (about 1,800 metric tons a year), but also to develop a valuable export trade. Operations will begin next year. Legislation will be introduced to enable the Government to establish a whaling commission to operate this enterprise.

Another whaling company of Perth has been issued a license and is reconstructing the old whaling station at Point Cloates and will operate in that area.

Bulgaria

DOLPHIN FISHING: The organization of dolphin fishing in the Black Sea during 1949 has been entrusted to the Fishing Section of the Bulgarian Ministry of Forests, according to an April 30 report from the American Legation at Sofia. The Industrial Enterprise "Canning Industry" is to buy the entire production of dolphin fat and fillets from the fishermen at a fixed price. In order to encourage dolphin fishing, the Government offers the crews certain quantities of food and staples at fixed prices, and will supply each fisherman with a certain amount of clothing, boots, and water-proof material for suits.

EDITORS' NOTE: The dolphin referred to in this news item may be any one of three species of Delphinus (the mammal).

Bizone Germany

COMMERCIAL ELECTRICAL FISHING DEVICE: Near Hamburg, Germany, the former German Navy minesweeper, R 96, is being fitted with an electrical device to be used in sea fishing. The device was invented by Dr. Konrad Kreutzer, a physicist who is responsible for several basic patents on the selenium rectifier. He was led to his latest invention by his work on electro-shock apparatus during the war, according to a June 24 consular report from Bremerhaven.

Dr. Kreutzer reasoned that fish could be caught by placing two electrodes into the water and putting a varying positive voltage on one electrode. The positive voltage on this one electrode (the anode) would cause the fish to point towards it. The varying electric field along the spine of the fish would cause the tail muscles to contract and relax, moving the tail and propelling the fish into a net near the anode.

Because patents have not yet been obtained on his device, Dr. Kreutzer was not willing to reveal all details of it. However, he did indicate that in the experimental model he hopes to test at sea late this summer, the anode will be incorporated in the fishing net and the cathode rounded to minimize the effects of electrolysis and kept near the boat. The wave-form of the anode voltage will be impulsive and approximately triangular, with a sharp rise from null and a much slower decay. The pulse length will be about 2 milliseconds and the pulse rate variable from 2-20 per second depending upon the natural wiggling frequency of the particular type of fish sought. Because of the low electrical resistance of sea water, the pulse current will be about 10,000 amperes.

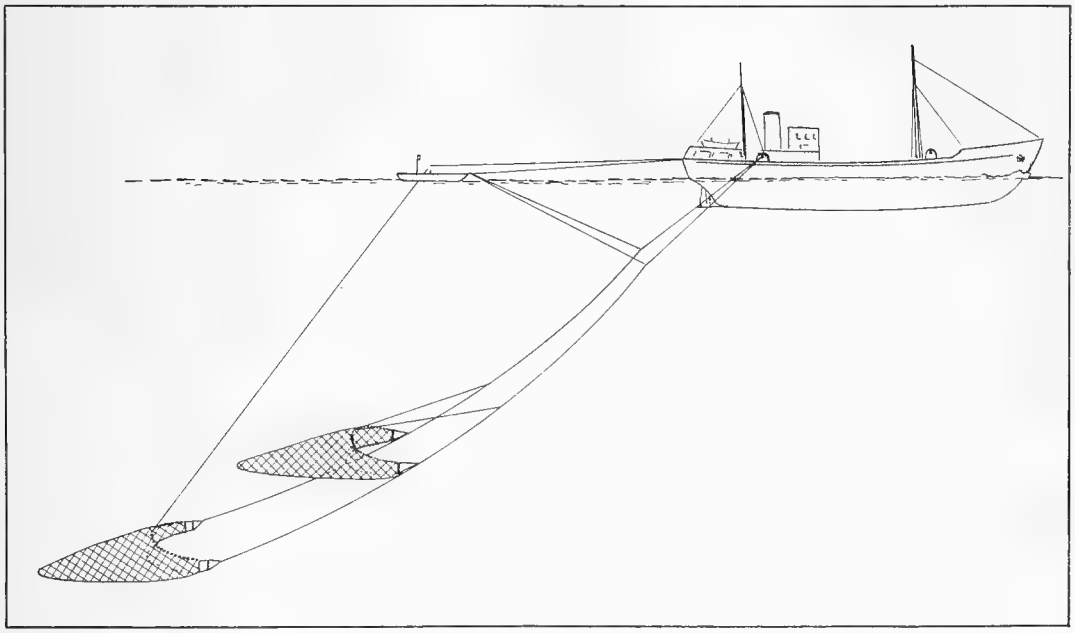
Kreutzer has not made public any quantitive results of his previous experiments but he seems to be convinced of the usefulness of his device. At one time an American food packer was ready to contribute capital, but the Military Government's prohibition on foreign investment in Germany prevented the plan from being consummated. To complete the equipping of the experimental boat, DM 30,000 (approximately $9,000) is to be raised, either from the trawler owners' association or from public funds. On July 8th, the project will be explained to a group of representatives of the fishing industry. It is hoped to convince the fishing industry that the device is sound enough to warrant the investment required.

The details available to date on this German electrical commercial fishing device have been included in Fishery Leaflet No. 348. Copies of this publication are available free upon request from the Division of Information, U. S. Fish and Wildlife Service, Washington.

British East Africa (Tanganyika)

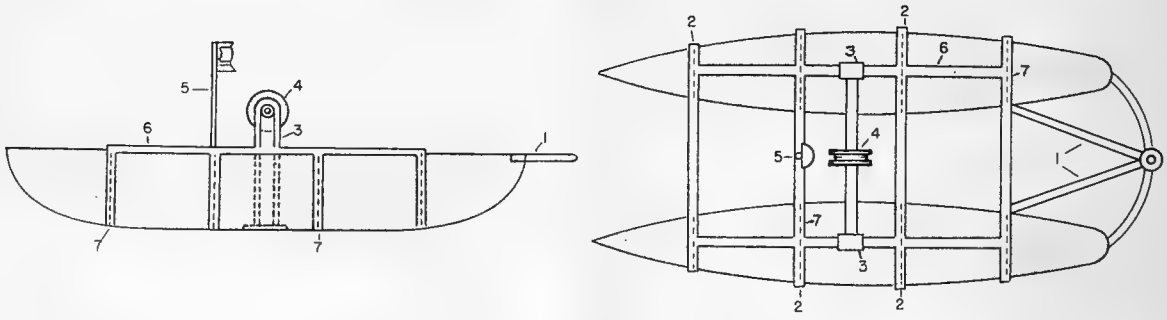
NEW-TYPE TRAWL (SCHATZ): A new-type fishing trawl (similar in certain respects to the Danish floating trawl) has been invented by Friedrich K. Schatz of Tanganyika, British East Africa, according to a recent report from the American Consulate at Bremerhaven.

The new gear consists of a dragnet, very similar to the customary trawl, which will catch fish in any depth, i.e., 10, 20, or 50 yards below the surface, or close to the bottom. The heavy wooden otter boards of the trawls are dispensed with, as is the third board above the top line which serves to keep the



THE SCHATZ TRAWL SHOWING TWO NETS RIGGED ONE BELOW THE OTHER TO COVER A WIDER AREA. TO THE LEFT OF THE VESSEL IS THE FLOAT.

net wide open. In this way the resistance caused by these boards is eliminated and a considerably faster pull is accomplished, saving power, and eliminating some of the wear and tear upon the net, according to the inventor. As only the resistance of the net in the water has to be overcome, the net can be drawn by the power of a relatively small motor. Nets can be fished on both sides at the same time, and discharged first on port and then on starboard, as long as the catches are worth it.



THE DIAGRAM ON THE LEFT SHOWS THE SIDE VIEW AND THE RIGHT DIAGRAM THE TOP VIEW OF THE FLOAT WHICH IS PART OF THE SCHATZ TRAWL.

1. TOWING BAR
2. STABILITY HORIZONTAL BANDS FOR FLOATS
3. ROLLER TRESTLE
4. ROLLER
5. POSITION POLE
6. VERTICAL BARS
7. WALLS OF FLOAT

In addition, a device has been developed which indicates rather accurately the result of the catch. It is even possible to use several nets below each other so that a greater depth and area can be covered with one drag, depending on the power of the motor.

The construction consists of a float drawn by a vessel in such a manner that the net will be dragged through the school of fish. Height and depth adjustment of the net is done over the float by a device on board the vessel. As speedily as the net can be dropped, the float will be put into operation, because the manipulation is quite easy and does not interfere with the operation of casting and hauling the net. The float will be built in several sizes.

The inventor claims that this new trawl will catch fish that will not get into a drift net; the vessel can keep near a school of fish until it has been cleaned up; mackerel fishing in the North Atlantic will be simplified; schools of fish can be caught which could not be reached formerly because of the great depths in which they are found; and fishing in heavy weather is made possible.

British Guiana

ALTERS TARIFF ON SALTED FISH: Importers were notified on May 28, 1949, that salted fish imported from non-empire sources will be subject to a duty of $1.95 per cwt. (112 lbs.); from empire countries it will enter free of duty, according to the June 18 Foreign Trade of the Canadian Department of Trade and Commerce.

Colony of Sarawak

FISHERIES SURVEY: During the past year, the Development Secretary for the Colony of Sarawak has been working on various aspects of a development program, including the improvement of the fishing industry, according to a March 10 report from the American Consulate General at Singapore.

Approval has been given for a survey of the fisheries of Sarawak which commenced during the latter part of 1947, continued in 1948, and is still proceeding. The survey is a necessary step to the preparation of plans to assist the fishing industry.

The need for an adequate fisheries is most important since many of the people on the coast depend on fishing for their livelihood and the Colony is not, at present, self-supporting in this most important of foodstuffs which plays such a large part in the diet of its population. There are good fishing grounds in the immediate vicinity of Sarawak. Most of the fishing now carried out is by elementary and outmoded measures and methods of drying, curing, and marketing are wasteful and inefficient.

Cyprus

DIFFICULTIES OF FISHING INDUSTRY: An article appearing in the Cyprus Mail calls attention to the danger facing the Cyprus fishing industry, according to an April 19 report from the American Consulate at Nicosia. The number of fishing trawlers in Cyprus has increased to 10, of which 3 are in Limassol, and the average daily catch rarely exceeds 420 to 560 pounds, of which only 25 percent is composed of first-quality fish sold at 33 cents per pound. The balance is sold as second-quality fish at 11 cents per pound.

At this rate, and without allowing for loss due to holidays, bad weather, depreciation of equipment and engine trouble, there is only a small margin of profit, since the daily operating expenses are about $80.00 per trawler.

In view of the heavy cost of maintaining such trawlers, several owners are reported to be contemplating anchoring their vessels for an indefinite period, extending after the "closed season" (no fishing is permitted in June, July, and August). Moreover, a further reduction of the supply of fish is anticipated, owing to competition from foreign trawlers. Italian, Arabian and Greek fishing vessels regularly visit Cyprus and are granted fishing licenses for Cyprus waters.

Dominican Republic

CONCESSION FOR DEVELOPMENT OF FISHERIES: A contract for the development of fisheries in Dominican waters, involving the use of 50 motor vessels and 200 employees during the first year of the contract, was signed May 26, 1949, according to a June 25 consular report from Ciudad Trujillo. The contract was subsequently approved by the Dominican Congress and promulgated June 9, 1949.

The company benefiting from the contract is organized as a Dominican corporation, Compania Pesqueria Dominicana, C. Por A. (Dominican Fisheries Company), with an American as the president and treasurer.

The company will carry on exploration of fisheries possibilities in Dominican waters for the development of a large-scale export industry in shrimp, spiny lobsters and shark products, as well as other fishery products. The objective of the company is to reach a weekly production for export, after the first year of the contract, of 100,000 pounds of fish and 1,000,000 pounds of shrimp. At current prices, the annual value of the catch would be about $11,000,000.

The enterprise would include the construction of packing houses, wharves, an ice plant, and other installations for a major project. The company would undertake also to supply fish for the domestic market and to provide local fishermen with assistance in the form of fishing vessels and equipment; and establish fish hatcheries.

General exoneration from import duties and taxes in connection with the company's operations is granted under the contract. The Dominican Government retains the right to acquire the company's property at the expiration of the contract at cost less depreciation. The contract is subject to cancellation at the end of the first year if the company fails to operate with at least 50 motor vessels and 200 employees.

Possibilities in the development of commercial fisheries in Dominican waters have been given serious attention on various occasions in recent years. Conclusions generally were that opportunities were not particularly favorable. The shore line in most places drops off steeply to ocean depths. Much of the Dominican coast is rocky, exposed, and dangerous for small boats. The Samana Bay area, where the new company plans to carry on its exploration, offers the only extensive area where there is shoal water favorable to fish propagation and to commercial development of fisheries. There has been very little development thus far of commercial fishing, the annual catch being only about 1,000,000 pounds. Imports of salt fish are important, valued at about $700,000 in 1947.

Ecuador

PLANS EXPANSION OF FISHING INDUSTRY: The Department of Fishing of the Ministry of Economy has announced plans for the stimulation of the domestic fishing industry, by encouraging domestic consumption of bacalao and shark, abundant in the Galapagos fishing grounds, according to a July 8 report from the American Consulate General at Guayaquil. Credits will be given to Ecuadoran fishermen for buying and improving boats, equipment, etc. and setting up an agency for the purchase and distribution of fish, at prices reasonable enough that the low-income groups of Ecuador may take advantage of a larger supply for greater fish consumption.

This plan is still in the project stage, and so far no steps have been taken for its realization. The government hopes eventually to employ the penal colony in the Galapagos Islands in this project.

Iceland

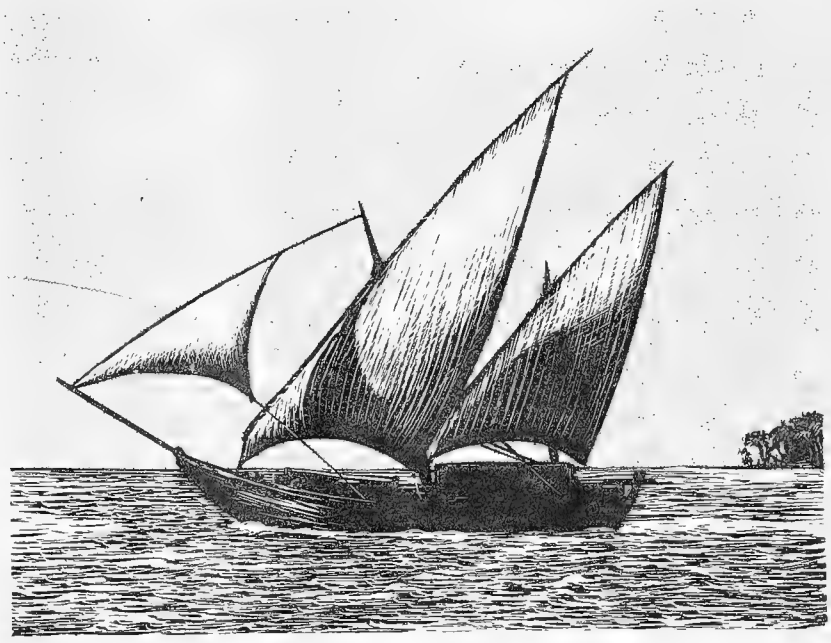
WHALING OPERATIONS, 1948: In 1948, Iceland resumed whaling operations for the first time since World War II. The whaling season, which commenced May 1 and ended October 15, accounted for a total catch of 239 whales, according to a March 29 Amercian consular report from Reykjavik. A total of 1,500 metric tons of whale oil was produced, 80 tons of meal, and 1,060 tons of whale meat.

The Icelandic Government bought the whale oil from the whale processing factory at approximately $443 per metric ton. In 1948, 773 metric tons were exported to Denmark and the Netherlands; 640 tons of meat were exported to the United Kingdom (27 cents per pound c.i.f.) and 224 tons went to Norway (15½ cents per pound f.o.b.).

India

EXPANDS FISHING FLEET: The Government Fisheries Department of Madras, India, is examining the possibilities for the construction of small motor boats, fitted with 5 to 7 h.p. engines, according to a May 10 American consular report from Madras, India. The price range is restricted to $1,050 to $1,200. This program is to assist fishermen engaged in marine fishing.

It is also reported that two Dutch trawlers have been acquired for the deep sea fishing fleet in Bombay.



TYPICAL FISHING VESSEL OF INDIA.

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BOMBAY TO EXPAND FISHERIES: An intensive drive to catch more fish is planned by the Bombay Director of Fisheries, according to a June 1 report from the American Consulate General at Bombay, India. The Fisheries Department will organize propaganda tours in the coastal villages where fishermen will be taught improved methods of catching fish and fish preservation. The formation of fishermen's cooperatives will be encouraged and these will be provided with the necessary fishing equipment.

The Provincial Government contemplates purchasing refrigerated vans and loaning them to the cooperatives to facilitate transportation of fish to consumer markets.

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GOVERNMENT URGED TO ESTABLISH FISHING STATIONS: Indian fishing experts urge the Government of India to establish fishing stations at Cochin, Visakhapatnam, Orissa, and Calcutta, according to a May 24 American consular report from Madras. Staffed by experts, these stations would direct exploratory voyages and help professional fishermen modernize their boats and fishing methods. All four stations, would be equipped with cold storage plants; in addition, a prawn (shrimp) cannery is planned at Cochin. Government expenditures are estimated at $5,670,000, while operational catches are estimated at $2,820,000 per year.

Italy

YUGOSLAVIA PERMITS ITALIAN FISHERMEN TO FISH IN ADRIATIC SEA: Italy and Yugoslavia have recently concluded a two-year agreement settling the question of fishing in the Adriatic Sea, according to an April 21 report from the American Embassy at Belgrade. Under this agreement, Italian fishermen are allowed to fish in four zones off the Yugoslavian Adriatic coast with an agreed number of vessels, and in return, Italy will pay Yugoslavia an amount (approximately $1,275,000 during the first year) to be determined each year. The Agreement will be considered automatically renewed unless denounced by either party.

This Agreement satisfies the needs of the fishing population on the Italian side of the Adriatic where there is practically no fish stocks.

Japan

FACTORS AFFECTING PRODUCTION OF FISHERY PRODUCTS, 1948-51: SCAP's Natural Resources Section has estimated Japanese fisheries production for 1950 at 7,011,000,000 pounds and 7,108,000,000 pounds for 1951 as compared with 5,700,000,000 pounds in 1948 and an estimated 6,800,000,000 pounds this year, according to a June 27 press release.

Actual production may deviate considerably from the estimates as the result of biological or oceanographic conditions. As in fisheries in other parts of the world, the production of the Japanese fisheries, particularly some of the pelagic species, are featured by sharp fluctuations, the principal causes of which are variations in environmental conditions affecting spawning and survival of young and in oceanic conditions affecting the migrations and availability of marketable fish.

The sardine and herring fisheries, which have been declining in recent years, are liable to such sharp fluctuations both in abundance and availability. The conditions affecting the catch of these fish in particular may affect production significantly for 1950 and 1951.

Since the surrender in 1945, shortages of materials such as nets, twine, and rope have limited production seriously. Beginning in 1948 larger quantities of materials were imported by the Supreme Commander for the Allied Powers for the Japanese fisheries, and in 1949 it is expected that the supplies of such materials will about meet the minimum requirements for the present SCAP-authorized fishing area.

By 1950 and 1951 it is expected that there will be no serious shortage of materials, so that production will reach the maximum which can be obtained from the present area on a sustained yield basis. Further increases will depend on improvements in sardines and herring, better management of other fisheries to increase their productivity, and expansion of aquiculture.

New ice manufacturing and ice storage plants have been constructed to increase the over-all daily output of ice by 900 metric tons. This gain of about 6.5 percent over 1948 production will reduce the deficit in ice supply to the fishing industry from about 350,000 tons in 1948 to about 80,000 tons in 1949.

The incentive for fishermen to use more care in handling fish at sea is increased by the fact that a strict inspection system is being established at all major landing ports, and a revision of the link system for distribution of fuel oil is being considered. As soon as the inspection standards and procedures are firmly established, it is planned that no distribution of fuel oil will be made in exchange for fish of substandard quality.

Marketing conditions have improved owing to the increase in ice production noted above, an increase in cold storage capacity, a marked improvement in rail transportation facilities, and increased capacities in various phases of the fish processing industry.

The cold storage capacity in Japan is being increased by about 1,800 metric tons. More than 1,000 tons of this capacity expansion have been completed, and the remainder is expected to be constructed by December 1949. During 1948, 250 refrigeration cars of 25-ton capacity were constructed and are in operation. The construction of 300 additional 15-ton capacity cars in 1949 is in the planning stage. If this plan is finalized it will greatly ease bottlenecks existing in rail transportation.

The system used in the United States for accelerating the movement of perishable products trains has been adopted by the Japanese. Reefer cars containing such perishables as fish are now moved on a fast schedule with a minimum of delay at switching points. Consequently, fish shipments are arriving at their destinations in much better condition. Also, a system has been established whereby all rail cars used for the transport of foodstuffs are cleaned at regular intervals. The cars are inspected frequently to insure that the procedure established is functioning.

Increases in capacity of fish processing facilities have been realized with the construction or rehabilitation of freezing and cold storage plants, canning plants, and other processing establishments such as fish meal and fish cake plants. This permits the routing of a larger portion of the catch to these industries, thus relieving to some extent the gluts of fresh fish distribution channels, which have occurred in the past.

Legislation in the form of the Food Sanitation Act has been promulgated and is being implemented. About 2,000 inspectors have been assigned to major fish

receiving and shipping ports and are being trained to grade fish according to its end use.

Fish in prime condition is designated for transport to large consuming areas which are distant from the point of origin; fish of lower quality is allocated for consumption in local or nearby areas; and fish unfit for human consumption is designated as fertilizer.

When this inspection system is firmly established and functioning properly, it may be expected that price schedules will be adopted to conform to the grades of fish. This will serve to encourage the fish market operators to handle the fish in a proper manner and take cognizance of sanitary requirements.

Facilities for aquatic research in Japan are more numerous and extensive than in any other country, but research on fish population for the purpose of determining the management regulations needed to maintain high yield is far behind that in many other countries, both in quantity and quality. However, reorganization of the governmental research work has been initiated to provide for better cordination and attention to conservation problems, and several research programs on this subject are underway.

The department of the Japanese government having responsibility for fisheries matters has been reorganized and advanced from the status of a bureau to that of an agency. This stop should result in more efficient administration and research, inasmuch as one result of the reorganization is the creation of a Division of Research. This division will coordinate and supervise all research on fisheries problems done by the central government.

Cooperative programs for research on the herring and sardine fisheries, which have declined greatly in recent years, have been undertaken by the central government and some of the prefectural research institutions.

The entire educational system of Japan has been reorganized by recent legislative acts, and many fisheries schools and colleges will be affected.

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JAPANESE REPORT ON FISHERIES CONTROL AND MANAGEMENT: In a report submitted by the Japanese Minister of Agriculture and Forestry with reference to the program to enforce fisheries regulations, the Minister states that several Japanese fishing vessels since February 1947 have violated the MacArthur Line, especially in the eastern China Sea area, according to the July 2 Weekly Summary from the Natural Resources Section of SCAP. The Minister states that the reason for the increase of illegal acts is partly due to poor resources within the restricted fishing grounds and partly due to longing for the former prosperous eastern China Sea fishing area. In order to maintain strict supervision over the fisheries and fishing boats, the "Gist of Emergency Counter-Measures for Prevention of Infringement upon the Authorized Fishing Areas" was drawn up, and all possible efforts have been made to prevent violation of the MacArthur Line. Posters were distributed to urge fishermen to adhere strictly to the MacArthur Line, and warnings were issued whenever necessary.

Measures for maintenance of fisheries resources included an order issued August 7, 1949, which requested Japanese fishing vessels to submit fisheries statistics and data, in order to estimate the possible catch of fish; a survey

of aquatic resources in the eastern China Sea to determine the increase or decrease in the possible catch of fish in that locality; and action by the Japanese Government (effective March 22, 1949) to reduce the number of fishing boats by about 30 percent of the total number of the drag-net fishing boats and trawlers in the sea west of Longitude 130° E., so as to secure an equilibrium between the number of fishing boats and the aquatic resources.

In the future, in order to prevent infringement by Japanese fishing boats in eastern China Sea, the following measures are proposed by the Government with reference to the supervision of the fisheries:

1. Enforce strict supervision over fisheries by arranging for several inspection crafts (funds are to be provided in the budget in the near future in order to implement this measure;

2. Urge the fishermen to wake up to the need for preventing infringement of the MacArthur Line; and

3. Direct that fishing boats of more than 50 tons be equipped with radio installations in order to prevent illegal acts.

With reference to the maintenance of aquatic resources, the following measures are proposed by the Government:

1. Determine the policy for reducing by about 30 percent the total number of drag-net fishing boats and trawlers operating in the sea west of Longitude 130° E. and to enforce it beginning July 1, 1949;

2. Plan for keeping the catch fresh and for utilizing it to the best advantage; and

3. Continue the survey of the aquatic resources in the eastern China Sea.

ORDER ISSUED ON SUPERVISION OF JAPANESE FISHING AREAS: A directive issued by SCAP on June 30, 1949, to the Japanese Government authorizes the latter to establish an inspection system for the Japanese fishing area.

The purpose of the inspection system is to enforce measures to prevent Japanese fishing boats from trespassing outside the SCAP authorized fishing area, as well as other pertinent fisheries regulations issued by SCAP and the Japanese Government.

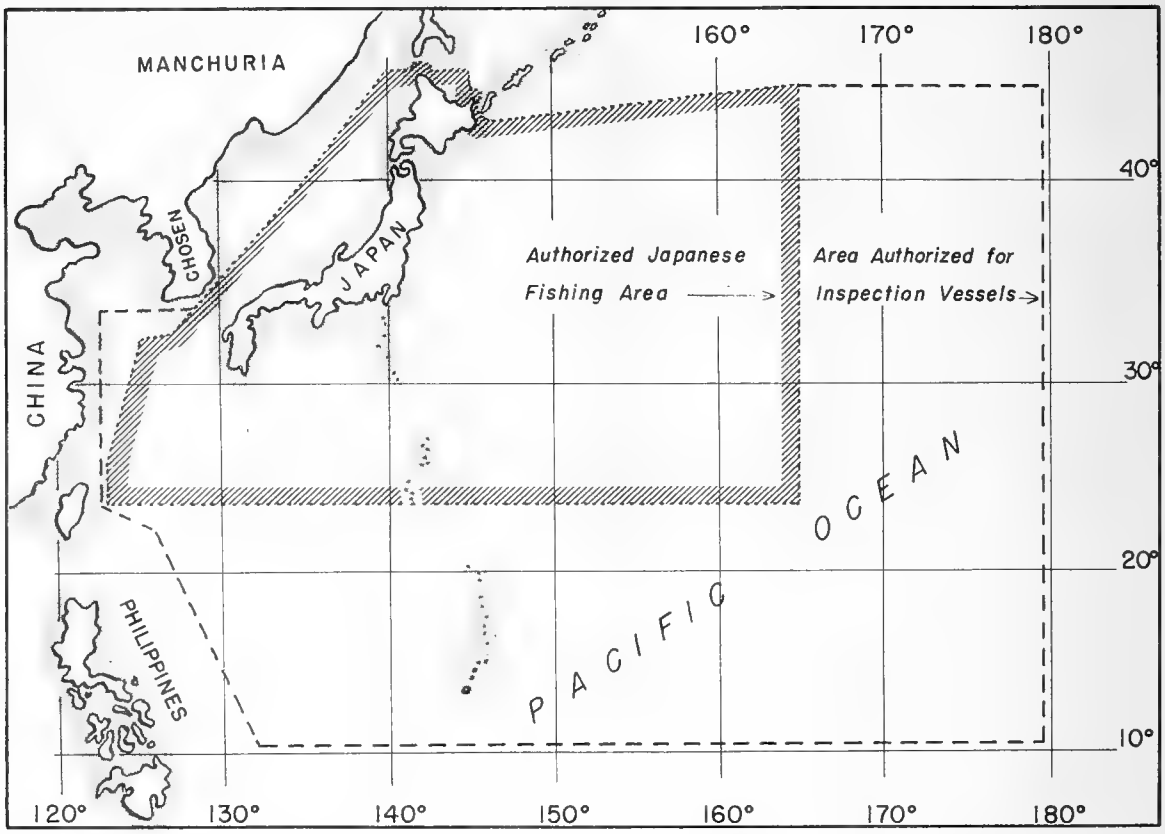
Available vessels of the type and size suitable for conducting inspection duties will be put into immediate operation (unarmed) and provisions will be made to increase the number of vessels used if the need for such is demonstrated to be necessary to insure effective enforcement. The Japanese Government is to take immediate action to carry out all phases of this plan.

Inspection vessels are authorized to operate within the area bounded as follows:

From a point midway between Nosappu Misaki and Kaigara Jima at approximately 43° 23' 14" North Latitude, 145° 50' 30" East Longitude; to 43° North Latitude, 146° 30' East Longitude; thence to 45° North Latitude, 165° East Longitude; thence east along the 45° parallel to the 180th meridian; thence south along the 180th meridian to 10° North Latitude; thence west along the 10° North parallel to 132° East Longitude; thence to 22° North Latitude, 126° East Longitude; thence to 24° North

Latitude, 122° 30' East Longitude; thence north to 34° North Latitude, 122° 30' East Longitude; thence east to 34° North Latitude, 128° 40' East Longitude; thence to 40° North Latitude, 135° East Longitude; thence to 45° 30' North Latitude, 140° East Longitude; thence east to 45° 30' North Latitude, 145° East Longitude rounding Soya Misaki at a distance of three (3) miles from shore; south along the 145th meridian to a point three (3) miles off the coast of Hokkaido; thence along a line three (3) miles off the coast of Hokkaido rounding Shiretoko Saki and following a mid-channel course through the Nemuro Kaikyo to a point 43° 26' 17" North Latitude, 145° 48' 03" East Longitude; thence in a southeasterly direction to the starting point midway between Nosappu Misaki and Kaigara Jima (see map).

In addition, Japanese inspection vessels shall not approach closer than ten (10) miles to the coast of any foreign country or its island possessions within the area defined in the preceding paragraph; shall use as a mark the modified International E instead of the Japanese flag; will not engage in fishing operations of any kind; shall obtain authorization for each voyage from Commander, United States Naval Activities, Japan; and will not be vested with police powers.



AREA AUTHORIZED FOR OPERATION OF JAPANESE INSPECTION VESSELS OUTSIDE THE AUTHORIZED SCAP FISHING AREA.

This authorization does not establish a precedent for the operation of inspection vessels in any other area for any subsequent period of time; nor is it an expression of Allied policy relative to the ultimate determination of natural jurisdiction, international boundaries, or fishing rights in the area concerned or in any other way.

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SCAP STATEMENT ON EXTENSION OF FISHING AREA: The chief of Natural Resources Section of SCAP made the following statement on fishing areas to the Japanese Minister of Agriculture and Forestry, June 10, 1949, according to the June 18 Weekly Summary of that agency:

> "I have received your letter of May 31, 1949, subject: 'Petition for Extension of Fishing Area for the Japanese Trawler and Drag-net Fisheries in the Eastern China Sea.' You transmitted with your communication the Cabinet Decision dated May 10, 1949.
>
> "In that letter you point out some of the problems of the trawling industry in the East China Sea and request that favorable consideration be given the petition for the extension of fishing area decided upon by the Cabinet on May 10, 1949.
>
> "The Supreme Commander for the Allied Powers is well aware of these problems of the trawling industry. Acting on his instructions, Mr. Herrington has pointed out frequently to the fishing industry and government officials the actions which they must take to meet these problems.
>
> "Japanese fishermen obviously would like to be readmitted to the high seas to conduct their operations with no restrictions other than those applying to all nations. The only way that these fishermen can achieve such an end is by convincing the Supreme Commander for the Allied Powers and the people of other nations of these two things.
>
> (1) Japanese fishermen will respect the regulations and agreements controlling their operations, whether these regulations are established by the Supreme Commander for the Allied Powers, their own government, or by international agreement.
>
> (2) Japanese fishermen and their government desire and are able to prevent over-exploitation of aquatic resources and to obtain the maximum sustained yield through adequate research and regulation.
>
> "Such convictions cannot be created by promises and assurances. They can be fostered only by effective and continued performance. This requires that Japanese fishermen and the Japanese Government comply with and enforce regulations on fishing operations promulgated by the Supreme Commander for the Allied Powers and the Japanese Government. This also requires that Japan must develop and apply a program involving adequate research on problems of aquatic productivity and application of the results of these studies through regulations designed to maintain the productivity of aquatic resources.
>
> "Please inform me if you and the other members of the Cabinet have considered these requirements and what action you have taken to satisfy them."

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SPECIAL AMERICAN MISSION STUDIES FISHERIES INDUSTRY: A press conference was held in Japan for a special American fisheries mission invited by the Supreme Commander for the Allied Powers to study the fisheries industry of Japan, according to the May 14 Weekly Summary of SCAP's Natural Resources Section. The mission

was composed of Edward W. Allen of Seattle, Washington, United States Commissioner on International Fisheries Commission, Frederick M. Bundy of Gloucester, Massachusetts, and Donald P. Loker of Terminal Island, California. The latter two are executives of fishing and fish processing companies.

In response to questions about their observations of Japanese fisheries and SCAP operations, Mr. Allen, acting as spokesman, stated that the Japanese Government and fishing industry should plan for the maximum possible sustained yield of fish from the authorized areas. This policy will not permit destructive fishing, but should be carried only to the point where subsequent years' catches will not be jeopardized.

SCAP's fishery policy has, he stated, not only been of enormous benefit to Japan but a substantial saving to the American taxpayer. What has been accomplished since 1945 with the aid of supplies and petroleum supplied by the United States through SCAP has been truly remarkable. Further progress, however, cannot be expected without better coordination of research, looking to greater knowledge of fish populations and points where danger of overfishing may occur.

The mission felt that for the Japanese fishermen to gain the good opinion of the people of other nations, the MacArthur Line must be scrupulously observed. To this end it is believed that patrolling of the line by the Japanese Government is essential and that SCAP personnel will be necessary to evaluate the reports and exercise surveillance over the Japanese patrol.

The fisheries of Japan are so important to the economy of the country and to Japan's international position that the mission felt that the Japanese Government should consider seriously the raising of the Fisheries Agency to the status of a Ministry, so that policy matters could be dealt with both on a domestic and international level as soon as a peace treaty is concluded.

The fisheries of Japan have always bulked large in international affairs of many nations. Today it appears that many of the old concepts are outmoded and never again will any nation be permitted to engage in destructive fishing off the coasts of another. The mission had particularly in mind the fisheries along the Pacific Coast of the United States and Canada which have been fully developed, studied, and managed by these countries to maintain their productivity and in which Japan has no historical interest. Any attempt by Japanese fishermen to enter these fisheries would be aggressively resisted.

"U. S. Special Mission Reviews Japanese Fisheries Situation," Fishery Leaflet No. 346, is a complete report and is available from the Fish and Wildlife Service, Washington 25, D. C.

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FISHING INDUSTRIES: The Fisheries Agency, Ministry of Agriculture and Forestry, submitted the following information on industries derived from fishing in Japan, according to the May 21 Weekly Summary of the Natural Resources Section of SCAP:

I. Preparations of Salted Fish and Dried Salted Fish

1. Mode of Fresh Fish Preparations

a. Scaling: No special machine is used for scaling salted fish and dried salted fish in Japan. If scaling is necessary it is usually done by hand using a knife.

b. Cleaning: Usually fish viscera are removed by hand, and fish are washed in tubs or tanks. Occasionally salmon intended for salting is cleaned by a special knife having a pipe inserted in the handle through which a small stream of water flows and washes away the blood and slime.

c. Skinning: Skinning machines are used only for skinning sea animals and sharks. Price of a small-type skinning machine is ¥70,000 ($194 U.S.), and a large-type machine costs ¥180,000 ($500 U.S.).

2. Salting with Dry Salt or with Pickling Brine

a. Density of brine: 24-35 percent for salted fish, 15-25 percent for dried salted fish, and 3-5 percent for boiled dried fish.

b. Number of days required for pickling in brine: 1 to more than 20.

c. Proportion of salt used to the weight of fresh fish: 10-35 percent for salted fish, 8-20 percent for dried salted fish, and 2-8 percent for boiled dried fish.

3. Method of Sun Drying or Through Artificial Driers

a. Drying methods: Few machines are used for making dried fish, salted dried fish, or boiled dried fish, except on rainy or cloudy days. Consequently, production in weight of dried fish per 24 hours cannot be estimated. Usually, fish are dried in the sun from three to seven days.

b. Main types of driers used:

(1) The Ogura type for drying boiled fish: Coal or firewood is used for fuel.

(2) The Saikei type: Daily capacity of 4,900 pounds with four refills. Fuel used is coal or firewood.

(3) Price of machines in 1947: One machine about ¥150,000 ($417 U.S.); setting up one machine about ¥30,000 ($83 U.S.).

c. Cost price (labor and fuel for one ton of dried fish):

(1) Price for one ton of smoked herring: Labor ¥12,450 ($34 U.S.), fuel ¥5,300 ($15 U.S.).

(2) Price for one ton of boiled dried sardine: Labor ¥13,300 ($37 U.S.), fuel ¥102,795 ($286 U.S.).

4. Percentage of Water and Salt in Products Obtained, and Preserving Duration, and Selling Price in Japan

a. Percentage of Water and Salt:

Kind of Fish	Water (percent)	Salt (percent)
Salted	50-70	15-35
Salted dried	35-50	5-10

Boiled dried fish average under 20 percent water

b. Preserving Duration: For salted fish about 120 days and for dried fish about 15-120 days.

c. Selling Price in Japan:

Product	Producer's Selling Price yen per 80 lbs.	Producer's Selling Price $ per cwt.
Boiled dried sardine	3,190	11.08
Salted dried sardine	2,005	6.96
Salted sardine	980	3.40
Dried herring	2,680	9.30

Note: Conversion of values based on official rate of exchange of 360 Japanese yen equal $1.00 U.S.

Product	Producer's Selling Price yen per 80 lbs.	Producer's Selling Price $ per cwt.
Salted herring	1,190	4.13
Dried cuttlefish	4,655	16.16
Salted cuttlefish	1,250	4.34
Dried cod	4,450	15.45
Salted dried cod (cut open)	4,000	13.89
Salted cod (cut open)	1,170	4.06
Boiled dried silvery anchovy	3,585	12.45
Salted and dried mackerel	4,460	15.49
Salted mackerel	2,795	9.70
Salted and dried mackerel-pike	2,140	7.43
Salted mackerel-pike	2,070	7.19
Salted bonito	3,915	13.60
Salted Alaskan pollock	1,790	6.21
Salted and dried horse mackerel	5,160	17.91

II. Salted Paste Preparation Based on Fish Used by Japanese Army: After the fish is cleaned with water and its bones and gills removed, the meat is minced by a meat grinder. The minced fish meat is put into a digestive tank with digestive enzyme and is fermented at 104° C. for six hours. The fermented fish meat is conducted from the digestive tank to a filtering tank and held at about pH, this being obtained by the use of hydrochloric acid, and then removed to a vapor-drying machine to be dried at 302° F. and 10 atmospheres. Equipment of a factory normally consists of two meat grinders, three digestive tanks, one filtering machine, and one vapor-drying machine. Raw material used might be shark.

III. Smoked Fish: Kinds of fish used are salmon, trout, herring, sardine, turbot, and flounder. Cold smoking requires about two months and warm smoking abou 10 days.

IV. Fish Meal and Fertilizer

1. Number and Equipment: A total of 322 fish meal plants was designated by the Japanese Government as of January 1949; 59 fish meal plants are equipped with compressors and artificial drying facilities; 6 fish meal plants are equipped with modern facilities for all processes.

At present, only one company is operating actively. Two other plants will make machines to order. The average price of one machine was ¥450,000 ($1,250 U.S.) as of October 1948.

V. Autolysates of Fish

1. Shiokara (brine-treated fish entrails): Generally, entrails of skipjack or oriental bonito are used for making shiokara. After entrails of fish are washed with water, they are cut into very small pieces and placed in a tub containing a 30 percent salt solution stirred often during the first month while fermenting.

2. Squid Shiokara (brine-treated squids): After squid are washed with water, they are cut into small pieces and placed in a tub with a 30 percent salt solution and stirred twice a day during the first month while fermenting. Sometimes yeast is added to aid the fermentation.

3. Fish Sauce: Fish cut into small pieces are placed in an enameled or stainless steel tub with 18-19 percent NaCl. In this case, pH value should be 4-5 and temperature 104°-122° F. When decomposition begins, the fish is filtered through coarse netting and after completion of the decomposition again filtered through closely woven silk gauze or through filtering machine, and then 1.5 percent of caramel is added.

Mexico

ADDS CERTAIN FISHING PRODUCTS TO IMPORT PROHIBITION LIST: Effective June 27, 1949, the Mexican Government issued a decree adding 207 items to the list of commodities (in effect since July 11, 1947) the importation of which are temporarily prohibited. No items included in Schedule I of the U. S.-Mexico Reciprocal Trade Agreement are among these additions, according to the Office of International Trade, U. S. Department of Commerce.

The fishery products, with Mexican tariff numbers and descriptions, included in the list are:

Tariff No.	
1.21.09	Fish, salted, smoked, preserved with salt or otherwise.
1.40.29	Manufactures of shell, coral or mother-of-pearl of all kinds, not specified.

The new items are understood to have been added to the import prohibition list as a measure to safeguard the stability of the new par value of the Mexican peso. The new par value, 8.65 Mexican pesos to one U. S. dollar, was declared by the Mexican government June 17, 1949, and has been accepted by the International Monetary Fund.

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NEW FISH CANNERY ESTABLISHED: Articles of incorporation for a new fish canning company have been approved, according to a June 9 American consular report from Mexico, D. F. The new company is capitalized at 500,000 pesos ($102,987 U.S.), of which 300,000 ($61,792, U. S.) will be financed by La Nacional Financiera, a government organization. The cannery will be erected at Magdalena Bay, Lower California. It will have a capacity of 1,000 cases a day, and it is expected to pack specialty products, including small sardines, Spanish mackerel, abalone, spiny lobster, tuna, clams, and oysters.

The company will have four small launches for operating in Magdalena Bay. They will probably also have a somewhat larger boat for freighting abalone and spiny lobster from camps along the coast. For the tuna, the cannery will have to depend upon deliveries from American fishing boats.

FORMATION OF A FISHERY BANK: According to the newspaper El Universal of May 16, there soon will be formed the "Banco de la Industria del Pescado" (Bank of the Fishing Industry), with a capitalization of 20,000,000 pesos (about $4,000,000). According to the release, in addition to financing the fishing industry, the bank will initiate an educational campaign in Mexico to increase the consumption of fishery products.

CLOSED MEXICAN SHRIMP SEASONS: The Mexican Ministry of Marine is studying the advisability of placing a closed season for shrimp fishing in the Gulf of Campeche.

While in Guaymas, the Director of Fisheries ordered that a closed season of 45 days, effective June 1, be placed on shrimp fishing in the Gulf of California. The normal closed season for outside waters in this area does not begin until August 1 and lasts until September 30. As presently effective, the closed season for shrimp fishing in outside waters in the Gulf of California will now be from June 1 to July 15 and from August 1 to September 30.

PROHIBITS USE OF NETS FOR SHARKS: The Diario Oficial of May 19 carried an order dated May 2, 1949, prohibiting the use of nets or seines for the taking of sharks at the mouth of the Colorado River, Sonora, within nine miles of the shore, or in the northern part of the Gulf of California or Cortes Sea, within the limits of the marine territorial waters of Mexico, from March 20 to April 30 each year. The purpose of this order is to protect the totoaba which, according to the order, are spawning at that time of year.

Note: Conversion of values based on the rate of exchange of 4.855 Mexican pesos equal $1.00 U.S.

* * * * *

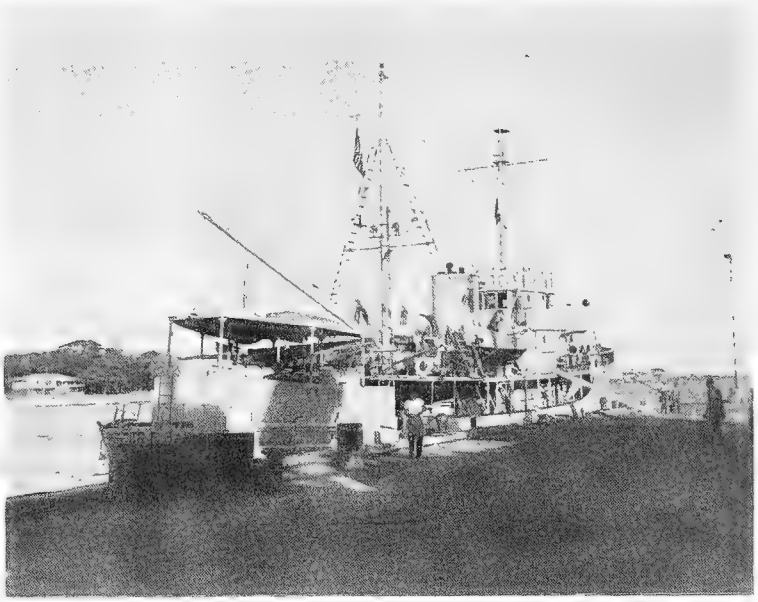
RESTRICTIONS ON FISHING PERMITS TO AMERICANS: Requests of American boats for permits to operate in Mexican Territorial waters must now be confirmed by the Mexican Directorate General of Fisheries or they will not be valid, according to items appearing in local papers and as reported on July 22 by the American Embassy at Mexico, D. F.

In addition, the Mexican Ministry of Marine announced that permits will no longer be issued to foreign boats for the purpose of fishing shark in Mexican waters. The reason given for this prohibition was that the sharks were being depleted.

Republic of the Philippines

SMALLEST TUNA SPECIMENS DISCOVERED: Discovery of the smallest specimens ever seen of two species of tuna fish in the Pacific Ocean was announced May 27 by the Administrator of the Service's Philippine Fishery Program, and the Director of the Philippine Bureau of Fisheries.

The specimens, the larva of the yellowfin tuna and the oceanic bonito or skipjack, were discovered in the extensive collections of microscopic animal life made by the American mission during its past two years in the Philippine waters. To Charles B. Wade, Aquatic Biologist of the Program, goes the credit for finding and identifying them.



SPENCER F. BAIRD, PHILIPPINE FISHERY PROGRAM RESEARCH VESSEL, DOCKED AT YAMBOANGA, MINDANAO.

An intensive search for facts in the life history of the various species of tuna has been going on for the past three years all over the Pacific, and this discovery is said to be a landmark in tuna research. Once the specimens were identified, it became apparent they were widely distributed throughout the southern Philippine waters. Collections were taken from the waters

of Antique Province, Panay, to the Pacific Ocean west of Halmahera Island and south in the Celebes Sea to Celebes and Makassar Strait.

According to Wade, the significance of this finding, as it pertains to the spawning grounds of the Pacific tunas generally, will have to await research in such far away places as New Guinea, Australia, and the Oceanic Islands. But the finding of the specimens proves that the Philippines constitute the spawning ground for some of the Pacific tunas.

Turkey

PLANS EXPANSION OF FISHERIES: An official of the Turkish Ministry of Economy and Food Supplies was sent to Denmark for two weeks to study the Danish fishery industry. He collected information in order to plan for the expansion of the Turkish fishery industry.

United Kingdom

GRIMSBY RESEARCH LABORATORY TO STUDY FISH SPOILAGE: The British Ministry of Food has recently opened a research laboratory at Grimsby, the largest fishing port in Great Britain, according to the May 28 issue of Fish Trades Gazette. The purpose of the laboratory is to insure that the fullest use would be made of fish caught and landed at Grimsby. It will study the causes and rate of deterioration in catches; the amount of loss as a result of deterioration; investigate the difference in quality of fish landed on the docks and as sold in inland towns; and attempt to find out how big are the spoilage losses, where they occur, and how to remedy them.

Department of State

U. S. MEMBER OF THE INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION APPOINTED: The Secretary of State announced July 28 that the President has named Mr. Alvin Anderson, Director of Fisheries of the State of Washington, as a United States member of the International Pacific Salmon Fisheries Commission, United States and Canada. The appointment of Mr. Anderson fills the vacancy created by the resignation of Mr. Milo Moore, who is at present in charge of the Greek fisheries program for the Economic Cooperation Administration.

The International Pacific Salmon Fisheries Commission is charged, by treaty between the United States and Canada, with the duty of conserving and rebuilding the sockeye salmon fishery of the Fraser River System of British Columbia. Spawning in the far reaches of the river system, these salmon migrate to the Pacific Ocean where they are caught by the fishermen of both countries. At the height of its productivity this fishery yielded in one year 2,400,000 cases of the finest quality salmon. Later the yield was reduced to a tenth of that figure. The large runs that have been observed this year give every indication that the work of this International Commission is proving successful in restoring the potentially valuable sockeye salmon fishery to its former high rate of production.

Other United States members on the Commission are: Mr. Edward W. Allen, Attorney, of Seattle, now serving as Chairman, and Mr. Albert M. Day, Director of the Fish and Wildlife Service of the Department of the Interior.

Eighty-first Congress (first session)

JULY 1949

Listed below are all the public bills, resolutions, etc. introduced and referred to committees, and passed by the Eighty-First Congress during July 1949 (unless otherwise specified) which affect in any way the fisheries and fishing and allied industries.

PUBLIC BILLS AND RESOLUTIONS INTRODUCED AND REFERRED TO COMMITTEES:

House of Representatives:

H. R. 5472 (Whittington) - A bill authorizing the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes; to the Committee on Public Works.

H. R. 5475 (Horan) - A bill to authorize the construction, operation, and maintenance of the Chief Joseph project on the Columbia River at Foster Creek, in the State of Washington, for irrigation, generation of electric power, and for the other purposes; to the Committee on Public Works.

H. R. 5482 (Sanborn) - A bill approving plans for the development of the Columbia River Basin, and for other purposes; to the Committee on Public Works.

H. R. 5484 (Sikes) - A bill to modify the Gulf intracoastal waterway between Big Lagoon and Pensacola, Fla.; to the Committee on Public Works.

H. R. 5528 (McKinnon) - A bill to give effect to the convention between the United States of America and the Republic of Costa Rica for the establishment of an Inter-American Tropical Tuna Commission, signed at Washington, May 31, 1949; to the Committee on Foreign Affairs.

H. R. 5165 (Cooley) - A bill to continue in effect until January 1, 1951, title III of the Second War Powers Act for the purpose of exercising import controls with respect to fats and oils and rice and rice products; to the Committee on Banking and Currency. (June 15, 1949.1/)

H. R. 5384 (McDonough) - A bill to provide for the holding of referendums among the citizens of the States to determine their wishes with respect to the establishment of valley authorities which would include their States; to the Committee on Public Works. (June 29, 1949.)

H. Res. 294 (Bland) - Resolution to amend the Rules of the House to provide that the Delegate from Alaska shall serve on the Committee on Merchant Marine and Fisheries; to the Committee on Rules.

Senate:

S. 2313 (Chapman) - A bill to provide for the establishment of a fish-cultural station in the State of Kentucky; to the Committee on Interstate and Foreign Commerce.

S. 2163 (Long) - A bill to authorize the transfer of the vessel Black Mallard from the Fish and Wildlife Service of the Department of the Interior to the Department of Wild Life and Fisheries of the State of Louisiana; to the Committee on Interstate and Foreign Commerce. (June 29, 1949.)

S. 2057 (McCarthy) - A bill making certain changes in law applicable to the Department of the Interior so as to permit the effectuation by the President and the Secretary of the Interior of the recommendations regarding the Department made by the Commission on Organization of the Executive Branch of the Government; to the Committee on Interior and Insular Affairs. (June 13, 1949.1/)

S. 653 (Thomas of Utah for himself and 12 others) - A bill to provide for the amendment of the Fair Labor Standards Act of 1938, and for other purposes; to the Committee on Labor and Public Welfare. Mainly increases minimum wage hour rates from 40 cents to 75 cents. (January 27, 1949.1/)

MESSAGES RECEIVED:

Senate:

International Technical Cooperation: Message was received from the Secretary of State submitting two drafts of proposed legislation to implement President's program to assist underdeveloped areas

to raise their standard of living. One proposal was for an International Technical Cooperation Act of 1949, which was referred to Committee on Foreign Relations, and the other was to amend the Export-Import Bank Act of 1945 so as to guarantee U. S. investments abroad, which was referred to Committee on Banking and Currency.

BILLS PASSED AND SIGNED BY THE PRESIDENT:

H. R. 1222 (P.L. 89) - An act to authorize the exchange of certain fishery facilities within the State of Washington. (Approved June 8, 1949.)

H. R. 4252 (P.L. 163) - To transfer the trawlers Alaska and Oregon from the Reconstruction Finance Corporation to the Fish and Wildlife Service. Approved July 13, 1949. Transfer made without transfer and reimbursement of funds. Authorizes the appropriation of such sums as may be necessary for the maintenance, repair, alteration, improvement, equipment, and operation of the vessels.

H. R. 5044 (P.L. 153) - An act to continue for a temporary period certain powers, authority, and discretion in respect to tin and tin products conferred upon the President by the Second Decontrol Act of 1947, and for other purposes. (Approved June 30, 1949.)

1/This bill was not shown under this section previously.

TOTAL PRODUCTION AND DISPOSITION OF THE DOMESTIC CATCH OF FISHERY PRODUCTS 1929 TO 1948.
(ROUND WEIGHT BASIS)

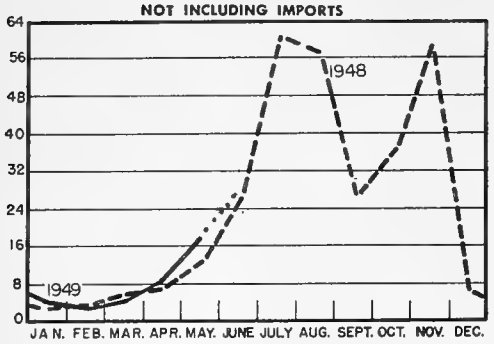
YEAR	FRESH & FROZEN	CANNED	CURED	BYPRODUCTS AND BAIT	TOTAL PRODUCTION
	(MILLION POUNDS)				POUNDS
1929	1,352	1,286	150	779	3,567,277,000
1930	1,389	1,077	145	676	3,286,580,000
1931	1,121	962	130	444	2,657,317,000
1932	1,032	787	140	655	2,614,140,000
1933	1,012	991	135	795	2,933,459,000
1934	1,087	1,293	130	1,548	4,058,015,000
1935	1,250	1,220	130	1,466	4,065,802,000
1936	1,321	1,459	135	1,845	4,760,330,000
1937	1,339	1,356	130	1,528	4,352,549,000
1938	1,355	1,234	130	1,534	4,253,445,000
1939	1,366	1,281	130	1,666	4,443,328,000
1940	1,461	1,280	130	1,188	4,059,524,000
1941	1,660	1,645	125	1,650	5,080,000,000
1942	1,407	1,230	115	1,125	3,877,000,000
1943	1,495	1,165	114	1,428	4,202,000,000
1944	1,589	1,225	110	1,580	4,504,000,000
1945	1,841	1,230	110	1,389	4,570,000,000
1946	1,651	1,220	115	1,410	4,396,000,000
1947	1,650	1,275	115	1,310	4,350,000,000
1948 1/	1,680	1,275	115	1,385	4,455,000,000

1/ESTIMATED.

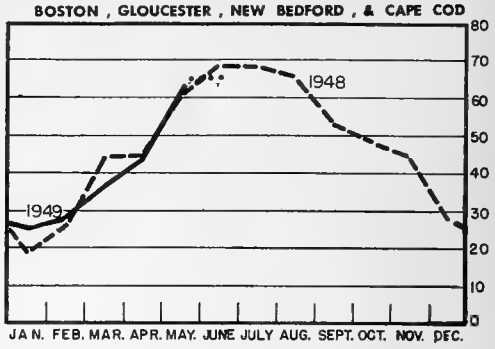
LANDINGS AND RECEIPTS

In Millions of Pounds

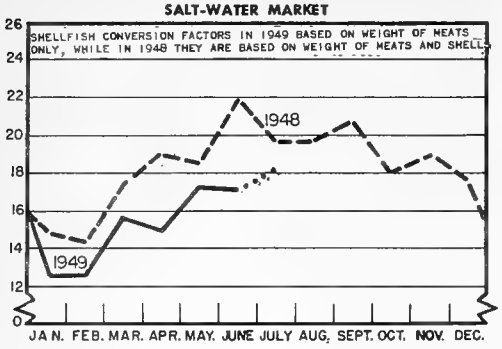
MAINE - LANDINGS
NOT INCLUDING IMPORTS



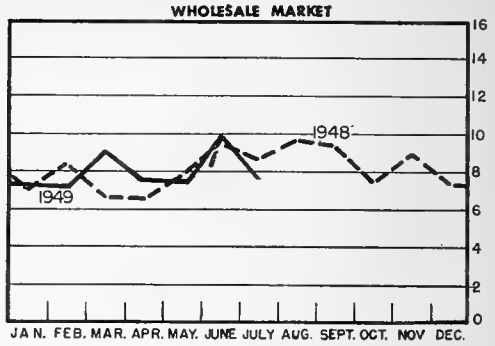
MASSACHUSETTS - LANDINGS
BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE COD



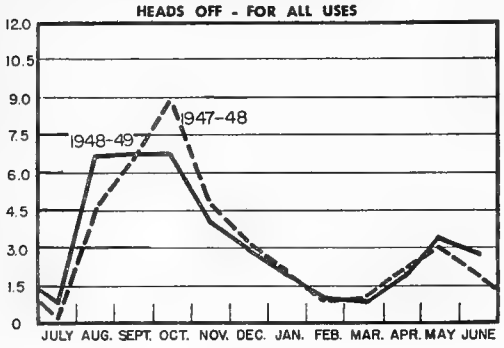
NEW YORK CITY-RECEIPTS OF FRESH & FROZEN FISH
SALT-WATER MARKET



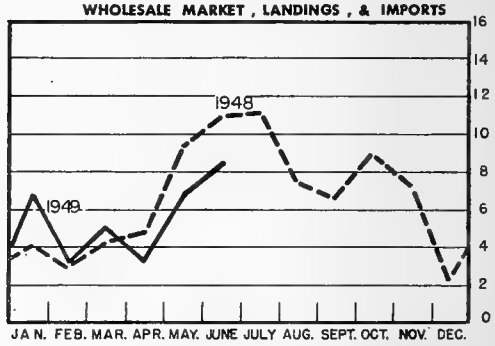
CHICAGO - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET



GULF - SHRIMP LANDINGS
HEADS OFF - FOR ALL USES

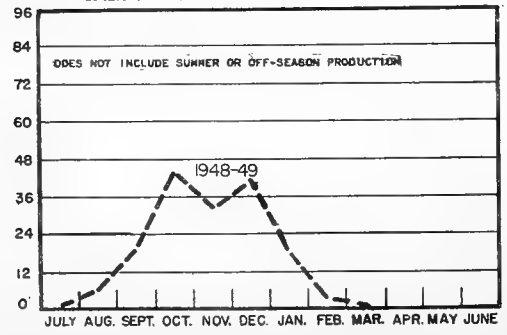


SEATTLE - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET, LANDINGS, & IMPORTS

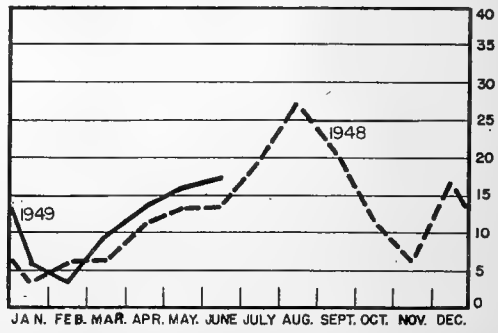


In Thousands of Tons

CALIFORNIA - PILCHARD LANDINGS



CALIFORNIA - TUNA AND TUNA-LIKE FISH

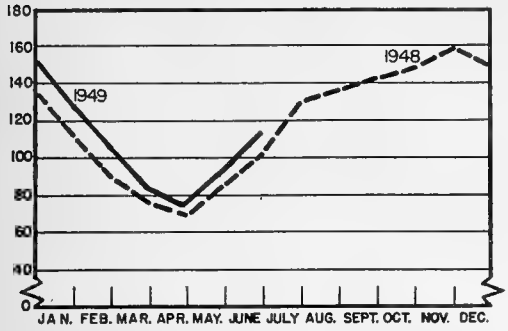


••••••• ESTIMATED

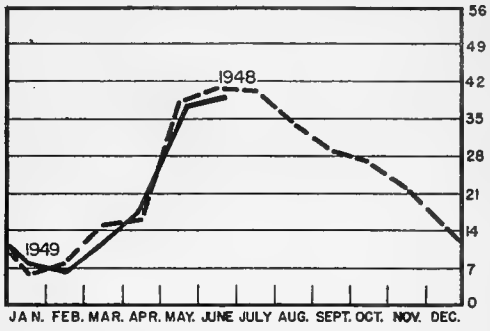
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

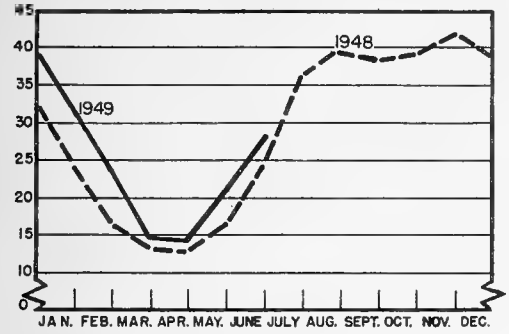
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



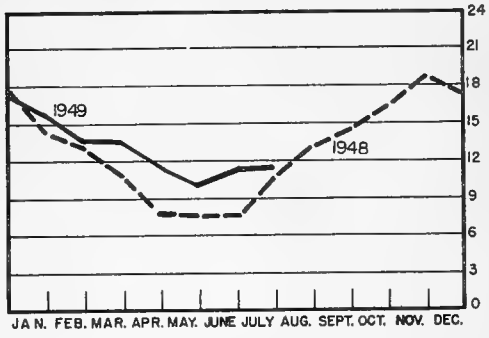
U.S. & ALASKA - FREEZINGS



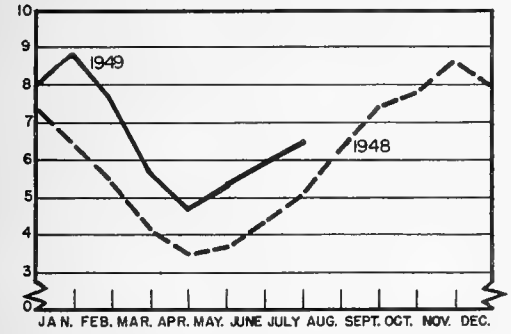
NEW ENGLAND - HOLDINGS OF FROZEN FISH



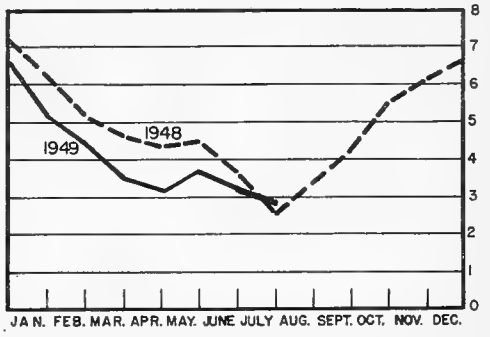
NEW YORK CITY - HOLDINGS OF FROZEN FISH



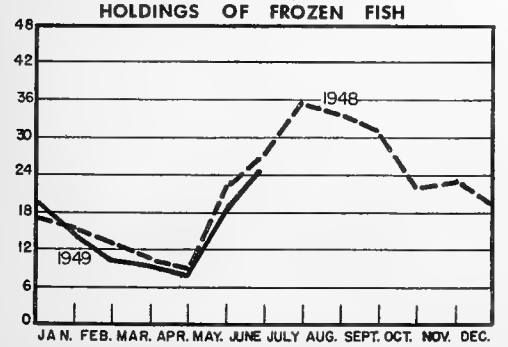
CHICAGO - HOLDINGS OF FROZEN FISH



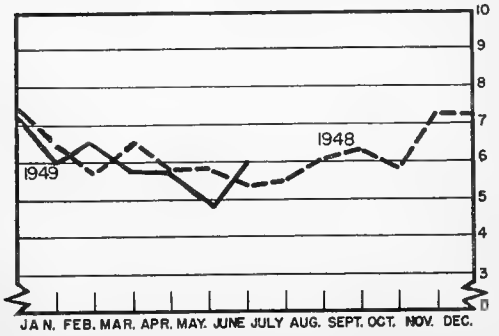
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



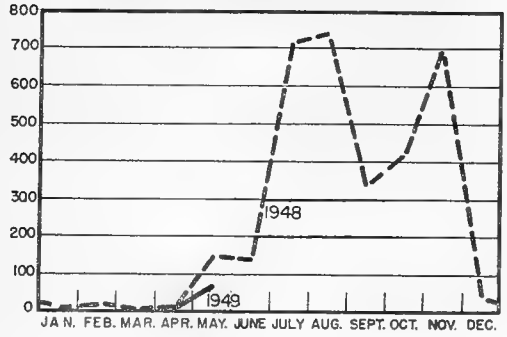
CALIFORNIA - HOLDINGS OF FROZEN FISH



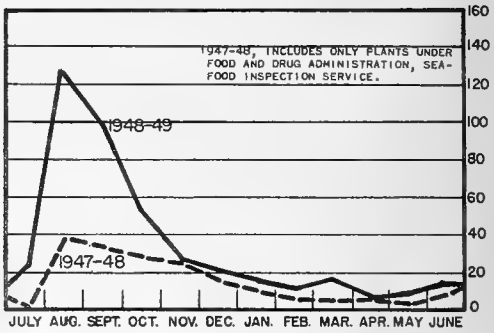
CANNED FISHERY PRODUCTS

In Thousands of Standard Cases

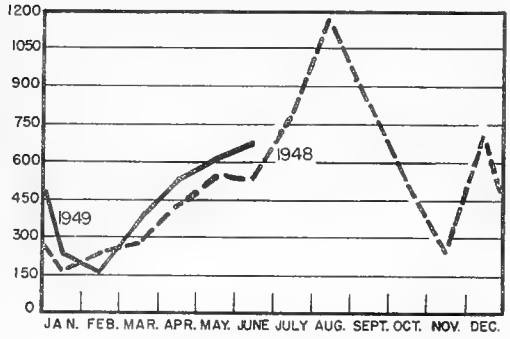
MAINE - SARDINES, ESTIMATED PACK



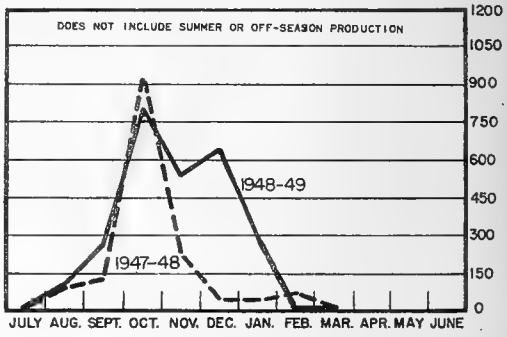
UNITED STATES - SHRIMP



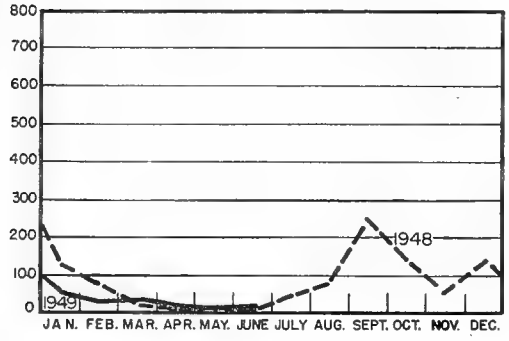
CALIFORNIA - TUNA



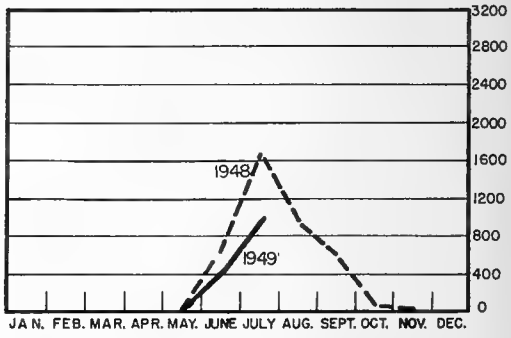
CALIFORNIA - PILCHARDS



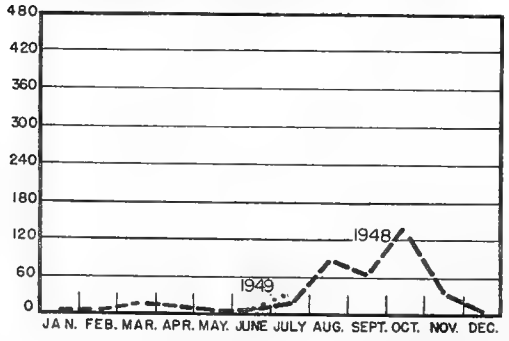
CALIFORNIA - MACKEREL



ALASKA - SALMON



WASHINGTON - PUGET SOUND SALMON

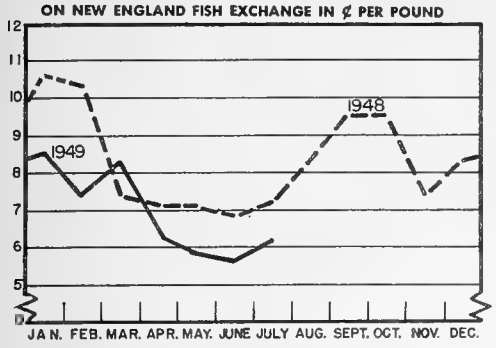


STANDARD CASES

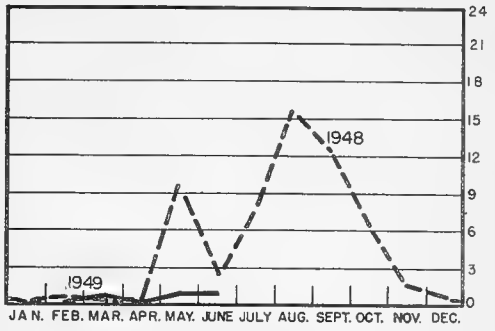
Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	No.1 picnic	7 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1-pound tall	16 oz.

PRICES . IMPORTS and BY-PRODUCTS

BOSTON - WEIGHTED AVERAGE PRICE
ON NEW ENGLAND FISH EXCHANGE IN ¢ PER POUND

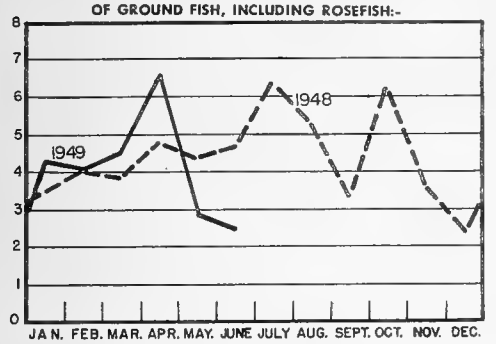


MAINE - IMPORTS OF FRESH SEA HERRING
IN MILLIONS OF POUNDS

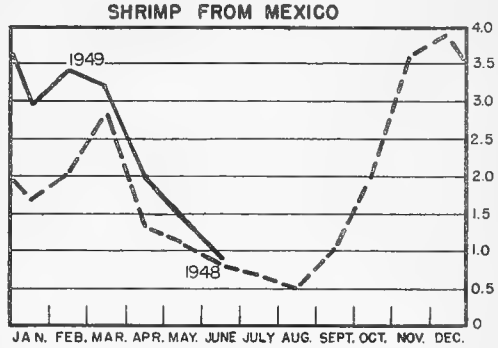


In Millions of Pounds

U.S. - IMPORTS OF FRESH & FROZEN FILLETS
OF GROUND FISH, INCLUDING ROSEFISH:-

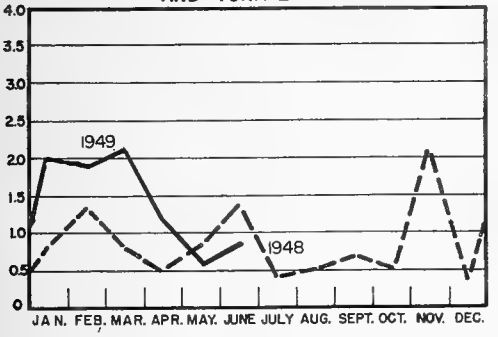


U.S. - IMPORTS OF FRESH AND FROZEN
SHRIMP FROM MEXICO

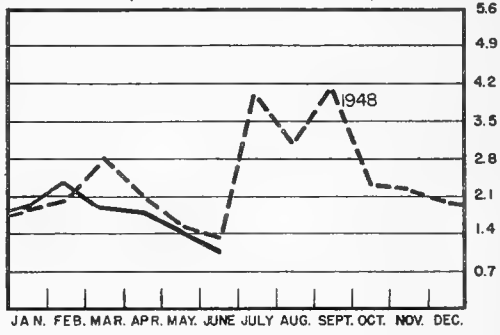


IN MILLIONS OF POUNDS

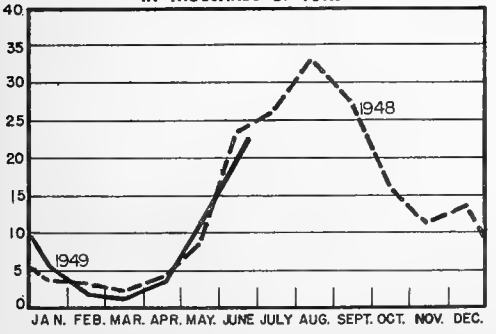
U.S. - IMPORTS OF CANNED TUNA
AND TUNA-LIKE FISH



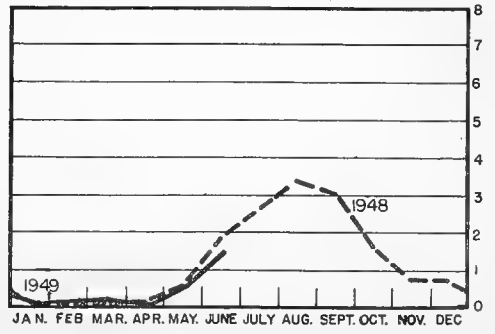
U.S. - IMPORTS OF CANNED SARDINES
(Include in oil and not in oil)



U.S. & ALASKA - PRODUCTION OF FISH MEAL
IN THOUSANDS OF TONS



U.S. & ALASKA - PRODUCTION OF FISH OIL
IN MILLIONS OF GALLONS



Recent publications of interest to the commercial fishing industry are listed below.

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
MDL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number		Title
CFS-478		- Fish Meal and Oil, May 1949
CFS-480		- New England Fisheries, 1946 Annual Summary
CFS-481		- Pacific Coast Fisheries, 1946 Annual Summary
CFS-482		- Massachusetts Landings, April 1949
CFS-483		- Frozen Fish Report, July 1949
FL-336		- Quarterly Outlook for Marketing Fishery Products, July-September 1949
FL-342		- Report of Alaska Exploratory Fishing Expedition, Fall of 1948, to Northern Bering Sea
SL-2	(Revised)	- Wholesale Dealers in Fishery Products, New Hampshire, 1949
SL-5	(Revised)	- Wholesale Dealers in Fishery Products, Connecticut, 1948
SL-6	(Revised)	- Dealers in Fishery Products, New York, 1949
SL-20	(Revised)	- Wholesale Dealers in Fishery Products, Texas, 1949
SL-105	(Revised)	- Firms Canning Alewives and Alewife Roe, 1948
SL-109	(Revised)	- Firms Canning Caviar and Fish Roe, 1948
SL-118	(Revised)	- Firms Canning Groundfish Flakes, 1948
Sep. 233		- Storage Life of Whole and Split Rockfish Fillets
Sep. 234		- Chicago Receipts of Fishery Products, 1948

MISCELLANEOUS PUBLICATIONS

THE FOLLOWING PUBLICATIONS MAY BE OBTAINED, IN MOST INSTANCES, FROM THE AGENCIES ISSUING THEM.

"Age and Length Composition of the Sardine Catch off the Pacific Coast of the United States and Canada in 1947-48," by Kenneth H. Mosher, Frances E. Felin, and Julius B. Phillips, reprint from California Fish and Game, January 1948, vol. 35, no. 1, 25 p., printed. California Division of Fish and Game, San Francisco, Calif. This is a second report, consisting mostly of tables, on age and length composition of the sardine (Sardinops caerulea) catch off the Pacific Coast of the United States and Canada and covers the 1947-48 season. The first report (Felin and Phillips, 1948) covered the period 1941-42 through 1946-47. Readings were based on scales from fish in the commercial catch with collections made by the Fisheries Research Board of Canada, the Washington State Department of Fisheries, the Fish Commission of Oregon, the California Division of Fish and Game, and the U. S. Fish and Wildlife Service.

Check List of the Florida Game and Commercial Marine Fishes (Including those of Gulf of Mexico and the West Indies, with approved common names), by Luis Rene Rivas, Educational Series No. 4, 39 p., printed, free. Marine Laboratory, University of Miami, Coral Gables, Fla. (Available from the State Board of Conservation, Tallahassee, Fla.) This list has been prepared to clear up the confusion which has arisen regarding the common names of the food or game fishes in the waters surrounding Florida, in the Gulf of Mexico, and in the West Indies. The names most often applied are listed for each species of fish and the most appropriate or preferred name is indicated, together with the scientific names. The booklet contains an index and a bibliography. Sharks and rays are not included in the list.

"The Fisheries of Norway," article, Trade News, July 1949, vol. 2, no. 1, pp. 17-23, processed, illus. Director of Information, Department of Fisheries, Ottawa, Canada. Presents a resume of the Norwegian fisheries and gives tables containing in many instances production data for the first part of 1949, and an analysis of Norway's fishery export trade.

"The Fisheries of Prince Edward Island," article, Trade News, July 1949, vol. 2, no. 1, pp. 8-10, processed. Director of Information, Department of Fisheries, Ottawa, Canada. Covers the production of fishery products in Prince Edward Island for 1948 giving landings and value and a short analysis of each principal species.

Growth of the Sardine (Sardinops caerulea), 1941-42 through 1946-47, by Julius B. Phillips, Fish Bulletin No. 71, 33 p., illus., printed. California Bureau of Marine Fisheries, Division of Fish and Game, San Francisco, Calif., 1948. A report of a comprehensive age-reading program started with the 1941-42 season on the Pacific sardine or pilchard. The readings were based on scales from fish in the commercial catch with collections made by the Fisheries Research Board of Canada, the Washington State Department of Fisheries, the Fish Commission of Oregon, the California Division of Fish and Game, and the U. S. Fish and Wildlife Service. The actual age interpretations were made jointly by the members of the latter two agencies and were published by Felin and Phillips (1948). In addition to general observations concerning the life history of the sardine, Tables 1 through 7 list the number of fish, mean length and standard error of the mean for each year-class for each season, 1941-42 through 1946-47, by region of catch.

"Las Riquezas de Nuestros Mares: El Ostion," (The Riches of Our Seas: The Oyster) by Isabel Perez Farfante and Gerardo A. Canet, article (in Spanish), Trimestre, January-March 1949, vol. III, no. 1, pp. 67-81, illus. Juan Bruno Zayas 319, Vibora, La Habana, Cuba. Outlines morphology, reproduction, nutritional values, of the Cuban oysters (Ostrea rhizoporae); the possibilities of developing this industry in Cuba, and also introducing the species Ostrea virginica. A map is included showing the areas where oysters are to be found or can be planted.

"1948 Food Consumption Surveys," Family Food Consumption in Buffalo, New York, Winter 1948, Preliminary Report No. 4, FE 701, 30 p., processed, 2/28/49. Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, U. S. Department of Agriculture, Washington 25, D. C. Reports on the average quantity and expense for purchased foods (including fish and shellfish), used at home per household per week, as well as the percentage of households using the various foods by annual income class and housekeeping families of two or more persons in Buffalo, N. Y. Includes data on fresh fish, canned salmon, other canned fish (including sardines and tuna), smoked and cured fish, fresh and frozen shellfish in the shell and shelled, and canned cooked shellfish.

Report on the Investigation of Albacore (Thunnus alalunga), Circular No. 17, May 6, 1949, 23 p., illus. with maps and charts, processed. Pacific Biological Station, Fisheries Research Board of Canada, Nanaimo, B. C. This

circular follows up Circular No. 12 (Accumulated Data on Albacore, May 10, 1948) which brought together all the data which had been collected up to that time in numerous miscellaneous observations on the albacore, and it includes sections on the results obtained by tabulating log-book records kept by fishermen and the results obtained from length measurements of fish at different ports. New and important sections describe the results of observations made aboard the patrol vessels Kitimat and Laurier, which were assigned by the Canadian Department of Fisheries to aid the albacore fishery fleet to find fish, and to possibly modify the preconceived ideas about the distribution of the albacore population. Includes data on fishing experiments and scientific observations; temperature and oceanographic conditions; feeding, tagging, age studies, and body temperatures of albacore.

"Rich Harvest Expected This Season by Greek Sponge Fishing Industry," by T. J. Monty, article, Foreign Trade, July 2, 1949, vol. VI, no. 131, pp. 16-17, Department of Trade and Commerce, Foreign Trade Service, Ottawa. (Available from the King's Printer Government Printing Bureau, Ottawa, Canada, 10 cents per issue). Gives the Greek production and value of sponges in 1948, landed prices of sponges for 1948 and 1949, and conditions in the industry.

Scouting for Herring Along the East Coast of Queen Charlotte Islands, March 1949, by J. C. Stevenson, Circular No. 16, April 1949, 4 p., processed. Pacific Biological Station, Fisheries Research Board of Canada, Nanaimo, B. C. This is a report on two Canadian Department of Fisheries patrol boats and a commercial vessel which scouted the east coast of Moresby Island in order to obtain information as to what quantity of herring might have been caught if fishing had gone on in the Queen Charlottes.

The Statistical Agencies of the Federal Government (A Report to the Commission on Organization of the Executive Branch of the Government), by Frederick C. Mills and Clarence D. Long, 224 p., printed, $2.00. National Bureau of Economic Research, Inc., New York, N. Y. This is a report of a survey of Federal statistical agencies conducted for the Commission on Organization of the Executive Branch of the Government (Hoover Commission). The survey contains data on the statistical activities that serve the operating needs of administrative and regulatory agencies of government and that supply Congress, the Executive Branch, and the public with information on economic and social conditions and processes. It discusses the Federal statistical activities; the organization, operation, and appraisal of the Federal statistical system, and concludes with certain recommendations. Included are the statistical activities of the Fish and Wildlife Service, but none of the recommendations affect the Service's statistical activities.

Stop Netting on the West Coast of Florida, by Clarence P. Idyll, Technical Series, No. 3, 23 p., illus., free. Marine Laboratory, University of Miami, Coral Gables, Florida, 1949 (Available from State Board of Conservation, Tallahassee, Florida). In order to obtain factual information regarding stop netting, an investigation was made of operations along the west coast of Florida. This booklet gives descriptions of the operation of six types of stop nets, with observations of the kinds, numbers, and size of fish caught, the effect of the fishing upon the sea bottom, the condition of the fish caught, and other pertinent facts. An evaluation of the various charges made against stop netting is outlined, the desirability of outlawing stop netting in Florida is discussed; and if stop netting is to be abolished, suggestions are made as to how this might be accomplished. Stop netting is illegal in Florida, but because of the variety of methods and because of the way the State law is worded, enforcement is difficult. Stop netting has been widely practiced over most of the State in recent years.

Third Semi-Annual Report (July 1 to December 31, 1948), by the Director, 24 p., processed, limited distribution. Institute of Fisheries Research, University of North Carolina, Morehead City, N. C. This publication presents the In-

stitute's program for scientific and technological research, and cooperative effort and activity. Scientific research includes studies on ocean shrimp and bottom mapping, investigation of shrimp in the sound and littoral waters, mollusc investigations, finfish investigations, and oceanography and hydrobiology. The technological research program consists of investigations on processing methods, distribution and marketing of fishery products; investigations on net deterioration; and experimental gear work. The cooperative effort and activity phase includes working and cooperating with other states and the Federal Government. In addition, the Institute plans the application of its findings for the education of the youth of North Carolina in high school and college, and the education of the fishermen.

Wildlife and Fishery Values of Bottomland Lakes in Illinois, by Frank C. Bellrose and Clair T. Rollings, Biological Notes No. 21, 24 p., processed. Illinois Department of Registration and Education, Urbana, Illinois, June 1949. Contains a section on the commercial fisheries (rough fish) catch and value of the bottomland lakes in the Illinois and Mississippi River Valleys for 1943 through 1947.

"World Hard Fiber Production Remains Below Prewar Average," article, Foreign Crops and Markets, June 20, 1949, vol. 58, no. 25, pp. 598-601, processed, free. Office of Foreign Agricultural Relations, U. S. Dept. of Agriculture, Washington 25, D. C. This article reports upon the 1948 world production of the three principal hard fibers--abaca or manila, henequen, and sisal. The uses and sources of supply of each fiber are discussed.

Year Book of Caribbean Research 1948 (Survey of Research and Investigation in Caribbean Commission Territories), 427 p., printed, $2.00. Research Branch, Central Secretariat, Caribbean Commission, Kent House, Port-of-Spain, Trinidad, 1949. This first edition of the research survey is a source book of Caribbean research and includes, among the many fields of research covered, fish and wildlife. It affords a basis also for the formulation and implementation of future plans of research designed to contribute to the well-being of the Caribbean area, for which the Caribbean Commission and its auxiliary bodies, the Caribbean Research Council and the West Indian Conference, have been established. Under fish and fisheries, it lists the research institutions in this field to be found in Barbados, British Guiana, Curacao, French Guiana, Surinam, Jamaica, Puerto Rico, and Miami, Florida; and under each listing is given a brief resume of the purpose of the institution.

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Illustrator -- Gustaf T. Sundstrom Compositors -- Jean Zalevsky, Carolyn Wood

61379

U.S. SPECIAL MISSION REVIEWS JAPANESE FISHERIES SITUATION

Fishery Leaflet 346, "U. S. Special Mission Reviews Japanese Fisheries Situation," is a report prepared by a special American fisheries mission invited by the Supreme Commander for the Allied Powers to study the Japanese fisheries industry.

The Mission in its conclusions stated that they endorsed the policy of SCAP aimed at maximum sustained production; supervision over the distribution of gear and oil; close liaison between SCAP and the Japanese Fisheries Agency and the advancement of that Agency to the status of a Ministry; the position that Japanese research should be concentrated on conservation; the firm attitude toward petitions for extension of the MacArthur Line; a patrol of the fishing areas by the Japanese Government supervised by SCAP; the democratization of Japanese industry. In addition, they oppose the Japanese being permitted to engage in the coastal fisheries of any of the allied powers and urge that as long as SCAP has control such fishing be prohibited. The mission also believes that when a treaty of peace is negotiated with Japan that permanent fishery treaties should be concurrently negotiated and not left for subsequent action, and that they should include protection of world coastal fisheries, sound policies for high sea fishing, the international whaling convention, a fur-seal treaty, and respect for international fishery conventions.

Copies of Fishery Leaflet 346 are available free upon request from the U. S. Fish and Wildlife Service, Washington 25, D. C.

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DEPARTMENT OF THE INTERIOR
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